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ENCYCLOPÆDIA BRITANNICA.

LIEGE, a biſhopric of Germany, in the circle of Weſtphalia; bounded to the north by Brabant, to the ſouth by Champagne and Luxemburg, to the eaſt by Limburg and Juliers, and to the weſt by Brabant, Namur, and Hainault. It is very unequal both in length and breadth; the former being in ſome places above 90 miles, in others not half ſo much; and the latter in ſome places 45, in others hardly 25. The air here is very temperate; and the ſoil fruitful in corn, wine, wood, and paſture. Here alſo are mines of lead and iron, pits of coal, quarries of marble and ſtone, and ſome celebrated mineral waters, as thoſe of Spa and Chau-fontaine. The principal rivers are, the Maes and Sambre. The manufactures and commodities of the country are chiefly beer, arms, nails, ſerge, leather, with the products we have juſt mentioned. The ſtates of the biſhopric are compoſed of three bodies: the firſt is the chapter of Liege; the ſecond, the nobility of the country; and the third, the deputies of the capital and the other towns. The three eſtates are ſeldom called together, except to raiſe taxes for the ſervice of the province, or upon ſome particular emergency; but there is a committee of the ſtates, who meet thrice a-week, and in time of war daily. They are always about the prince-biſhop, to make remonſtrances, and demand the redreſs of grievances. The biſhop is ſpiritual and temporal lord of the whole country; but, as biſhop, is ſuffragan to the archbiſhop of Cologne. He ſtyles himſelf, *by the grace of God, biſhop and prince of Liege, duke of Bouillon, marquis of Franchimont, count of Looz, Hoorn*, &c. His arms for Liege are, a pillar argent, on a pedeſtal of the ſame, with a crown or, in a field ruby. In the matricula he was formerly rated at 50 horſe and 170 foot; or 1280 florins monthly, in lieu of them, but now only at 826. An abatement of one-third has alſo been granted of the ancient aſſeſſment to the chamber-court, which was 360 rix-dollars 62½ kruitzers for each term. Here are ſeveral colleges which ſit at Liege, for the government of the country, and the deciſion of cauſes, civil, criminal, ſpiritual, and feudal, and of ſuch alſo as relate to the finances. The chapter conſiſts of 60 perſons, who muſt either prove their nobility for four generations, both by father and mother, before they can be admitted: or if they cannot do that, muſt at leaſt have been doctors or licentiates of divinity for ſeven years, or, of law, for five years, in ſome famous univerſity. The biſhopric is very populous and extenſive, containing 1500 pariſhes, in which are 24 walled towns, beſides others, 52 baronies, beſides counties and ſeigniories, 17 abbeys for men, who muſt be all gentlemen, and 11 for ladies, excluſive of others.

LIEGE, the capital of the biſhopric of the ſame name, ſtands upon the Maes, in a fine valley, ſurrounded with woods and hills, being a free imperial city, and one of the largeſt and moſt eminent in Europe. Though it is 100 miles from the ſea by water, the Maes is navigable up to it. The city has 16 gates; 17 bridges, ſome of them very handſome; 154 ſtreets, many of them ſtraight and broad; a fine epiſcopal palace; a very large ſtately cathedral, in which, beſides five great ſilver coffers full of relics, are ſeveral ſilver ſtatues of ſaints, and a St George on horſeback of maſſy gold, preſented to the cathedral by Charles the Bold, by way of atonement for uſing the inhabitants cruelly in the year 1468. Of the other churches, that of St Paul is the moſt remarkable, both for its ſtructure and fine ornaments in painting and marble. The city is well fortified, and there are alſo two caſtles on the mountain of the Holy Walburg for its defence. Beſides a great number of other convents of both ſexes, here is a college of Engliſh Jeſuits, founded in the year 1616, and a fine nunnery of Engliſh ladies. Indeed, churches, convents, and other religious foundations, take up the greater part of it. The reader, therefore, no doubt, will take it for granted. that it is a moſt bleſſed, holy, and happy city. But however it may fare with the profane, unhallowed laity, it is certainly the paradiſe of prieſts, as it is expreſsly called, by way of eminence. It is divided into the old and new, or the upper and lower; and the latter again into the iſland, and the quarter beyond the Maes. The houſes are high, and built of bluiſh marble. In the town and ſuburbs are 12 public places or ſquares, 10 hoſpitals, a beguin-houſe, and two fine quays, planted with ſeveral rows of trees, for the burghers to take the air; but a great part of that within the walls is taken up with orchards and vineyards. The manufactures of this city are arms, nails, leather, ſerge, and beer. In St William's convent, without the city, is the tomb of the famous Engliſh traveller Sir John Mandeville, with an inſcription in barbarous French, requeſting thoſe who read it to pray for his ſoul. Near it are kept the ſaddle, ſpurs, and knife, that he made uſe of in his travels.

After having ſeen moſt of the cities of any note in the world, he made choice of this to ſpend the eve of his life in. A little way from the city, on the other ſide of the Maes, ſtands the epiſcopal palace of Seraing, in which the biſhops generally reſide during the ſummer. The latitude of this city is 50. 36. N. and the longitude 5. 40. E.

Some diſturbances took place here in the year 1789, in conſequence of certain diſputes that had ariſen between the prince-biſhop and the inhabitants. The latter having demanded certain privileges, which he did not think proper to grant, they took up arms, and compelled him and his chapter to comply with their requeſt. The prince, together with many of the clergy, nobility, and citizens, alarmed by this commotion, and dreading the conſequences of popular fury, which when once rouſed ſeldom knows any bounds, ſought ſafety by a voluntary exile. They then appealed to the imperial chamber; and this tribunal, inſtead of acting the part of arbiter, decided as a ſovereign, and ordered the circles of the Lower Rhine and Weſtphalia to execute the ſentence.

The king of Pruſſia, at whoſe court one of the chiefs of the inſurrection had reſided, and who wiſhed to gain a party at Liege, became mediator; and ſeemed to favour the Liegoiſe, many of whoſe claims were juſt, though they attempted to enforce them by violence and the moſt illegal ſteps. Intoxicated with this protection, the people of Liege treated the remonſtrances of their biſhop, the decrees of the imperial chamber, and the reſolutions of the directory of the two circles, with the utmoſt contempt; and proceeded ſo far as even to dethrone their prince, by appointing a regent in the perſon of a French prelate. The electoral college having deliberated on the beſt means of putting an end to theſe diſturbances, its propoſitions, though modified by M. Dohm the Pruſſian plenipotentiary, made the inſurgents break out into open ſedition. Deluded by their leaders, they gave themſelves up every day to new exceſſes; the effects of the citizens were expoſed to pillage, and their perſons to inſult. The king of Pruſſia, who was deſirous to bring matters to an accommodation, and not to inſtigate the Liegoiſe to become independent, finding that the efforts of his miniſter were not attended with the deſired ſucceſs, ſeemed unwilling to interfere any farther in an affair which might have led him into a quarrel with the empire. The executive troops, at the ſame time, remained almoſt in a ſtate of inactivity; and ſeemed rather to guard the frontiers of this petty ſtate, than to make any attempt to reduce it to obedience. Neither this conduct, however, nor the exhortations of Pruſſia, added to the moral certainty of their being ſoon compelled to lay down their arms, made any change in the conduct of the malecontents. They declared openly, in the face of all Europe, that they would either conquer or die; and they perſiſted in this reſolution, while commerce, manufactures, and the public revenues, were going daily to decay.

Having at length openly attacked the executive forces without the territories of their city, the emperor could no longer remain an indifferent ſpectator. It was now full time to put a period to that madneſs to which the people had abandoned themſelves; and to accompliſh this in an effectual manner, the imperial chamber at Wetzlar requeſted the emperor, as a member of the ancient circle of Burgundy, to execute its orders reſpecting this object. In conſequence of this meaſure, Baron Alvinzi, who commanded a body of Auſtrians cantoned in Limburg and the confines of Brabant, notified, by order of Marſhal Bender, to the ſtates and municipality of Liege, that the emperor intended to ſend troops into their city and territories, for the purpoſe of reſtoring tranquillity and good order. The ſtates had already been informed of this reſolution by their agent at Wetzlar. They therefore wrote to Marſhal Bender, to aſſure him of the reſpectful confidence which they placed in the juſtice and magnanimity of the emperor, and to requeſt that the Auſtrian troops might enter alone, without thoſe of the electors; and that they might be confined to occupy the gates and the ſuburbs only. To this letter, which was carried to Bruſſels by a deputation of the ſtates, Marſhal Bender returned a very ſatisfactory anſwer, relating to the diſpoſition of the electoral troops: but Baron Alvinzi, in a note which he wrote to the ſtates, inſiſted among other articles, that all the citizens ſhould throw down their arms; that proper accommodations ſhould be prepared for the officers and men; that the warlike ſtores, collected for making reſiſtance, ſhould be removed; and that cockades, and every other diſtinctive mark of the like kind, ſhould be laid aſide before the arrival of the imperial troops. However humiliating theſe preliminaries might be, eſpecially that of a general diſarming, the ſtates and municipalities acquieſced without the leaſt reſerve; and their ſubmiſſion, as ſudden as complete, was communicated to the people, with an exhortation to follow their example.

Notwithſtanding this pacific appearance, two days before the entrance of the imperial troops, the municipal council of Liege, flattering themſelves, perhaps, with the hopes of aſſiſtance from Pruſſia, aſſured the inhabitants that they would remain unſhaken in their poſt, and that they had ſworn never to deſert the cauſe in which they were engaged. This, however, did not prevent the Auſtrian troops, to the number of 6000, from penetrating, without oppoſition, into the heart of the city; where they occupied every poſt; made the citizens lay aſide their arms, uniforms, and cockades; and in a ſingle hour, dethroned ſo many ſovereigns of a year. The greater part of the municipal officers, who two days before had ſolemnly promiſed ſuch great things, betook themſelves to flight, and retired either to France or Weſel; while the ancient magiſtracy, which had been expelled in the month of Auguſt 1789, was proviſionally reinſtated by the directorial commiſſioners.—The decrees of the imperial chamber at Wetzlar have ſince been executed in their utmoſt extent. The ancient magiſtracy and the privy council of the prince-biſhop have been reſtored; and the prince himſelf having returned, peace and good order have been re-eſtabliſhed. The French took this city in 1792, and effected another revolution; but being driven from it in 1793, the citizens were once more obliged to ſubmit.

LIENTERY, a flux of the belly, in which the aliments are diſcharged as they are ſwallowed, or very little altered either in colour or ſubſtance. See MEDICINE *Index*.

LIEVENS, John or Jan, a celebrated painter, was born at Leyden in 1607. He diſcovered an early inclination for the arts, and was the diſciple firſt of Joris van Schooten, and afterwards of Peter Laſtman. He excelled principally in painting portraits; but he alſo executed ſeveral hiſtorical ſubjects with great ſucceſs. He came over to England, where he reſided three years, and painted the portraits of Charles I. the queen, the prince of Wales, and ſeveral of the nobility; after which he returned to Antwerp, where he met with full employment for his pencil. We have ſeveral etchings by this maſter, which are performed in a ſlight, but maſterly manner. The chiaro ſcuro is very ſkilfully managed in them, ſo as to produce a moſt powerful effect. His ſtyle of etching bears ſome reſemblance to that of Rembrandt; but it is coarſer in general, and leſs finiſhed.

LIEOU-KIEOU, the name of certain iſlands of Aſia, ſubject to China; but hitherto little known to geographers, who have been ſatisfied with marking their exiſtence and latitude in their charts. They, however, form a powerful and extenſive empire, the inhabitants of which are civilized, and ought not to be confounded with other ſavage nations diſperſed throughout the iſlands of Aſia. Father Gabil, a Jeſuit, has furniſhed us with ſome intereſting details reſpecting theſe iſlanders, which he extracted from a Chineſe relation, publiſhed in 1721, at the end of a voyage that was undertaken on the following account. The emperor Kang-hi having reſolved in 1719, to ſend an ambaſſador to the king of Lieou-kieou, choſe for this purpoſe one of the great doctors of the empire, named *Supao-Koang*. This learned man departed from China in 1719, and returned to Peking in 1720, where, in the year following, he cauſed a relation of his voyage to be publiſhed in two volumes. It is in the firſt of theſe that he gives an accurate and particular deſcription of the iſles of Lieou-Kieou; and what he relates appears to be worthy of the greater credit, becauſe, being on the ſpot, he examined, as he himſelf ſays, according to the orders of the emperor, whatever he found curious or intereſting, reſpecting the number, ſituation, and productions of theſe iſles; as alſo the hiſtory, religion, manners, and cuſtoms of the people who inhabit them.

Theſe iſles, ſituated between Corea, Formoſa, and Japan, are in number 36. The principal and largeſt is called *Lieou-Kieou;* the reſt have each a particular denomination. The largeſt iſland extends from north to ſouth almoſt 440 lys, and 120 or 130 from eaſt to weſt; but on the ſouth ſide, the extent from eaſt to weſt is not 100 lys. The ſouth-eaſt part of the iſland, where the court reſides, is called *Cheou-li;* and it is there that Kint-ching, the capital city, is ſituated. The king's palace, which is reckoned to be four leagues in circumference, is built on a neighbouring mountain. It has four gates, which correſpond to the four cardinal points; and that which fronts the weſt forms the grand entry. The view which this palace commands is moſt extenſive and delightful; it reaches as far as the port of Napa-kiang, at the diſtance of ten lys, to the city of Kint-ching, and to a great number of other cities, towns, villages, palaces, temples, monaſteries, gardens, pleaſure houſes. It ſtands in longitude 146° 26′ eaſt, and in latitude 26° 2′ north.

If we believe theſe iſlanders, the origin of their empire is loſt in the remoteſt antiquity. They reckon up 25 ſucceſſive dynaſties, the duration of which forms a period of more than 18,000 years. It would be uſeleſs to employ a ſingle moment in pointing out the abſurdity of theſe pretenſions. It is, however, certain, that the exiſtence of the country called *Lieou-kieou* was not known in China before the year 605 of the Chriſtian era. It was in the courſe of that year, that one of the emperors of the dynaſty of Soui, having heard of theſe iſles, was deſirous of knowing their ſituation. This prince at firſt ſent ſome Chineſe thither; but their expedition proved fruitleſs, as the want of interpreters prevented them from acquiring that knowledge which was the object of their voyage. They only brought ſome of the iſlanders with them to Sigan-fou, the capital of the province of Chen-ſi, which was the uſual reſidence of the emperors of the dynaſty of Soui. It fortunately happened, that an embaſſador of the king of Japan was then at court. This embaſſador and his attendants immediately knew the ſtrangers to be natives of Lieou-kieou: but they ſpoke of theſe iſles as of a miſerable and wretched country, the inhabitants of which had never been civilized. The emperor of China afterwards learned, that the principal iſland lay to the eaſt of a city called at preſent *Foutcheou-fou*, which is the capital of the province of Fo-kien; and that, in a paſſage of five days, one might reach the large iſland where the king kept his court.

On this information, the emperor Yang-ti ſent ſkilful men, accompanied by interpreters, to ſummon the prince to do homage to the emperor of China, and to pay him tribute. This propoſal was very ill received. The king of Lieou-kieou ſent back the Chineſe, telling them ſternly, that he acknowledged no prince to be his ſuperior. This anſwer irritated the emperor, who, to obtain revenge, cauſed a fleet to be immediately equipped in Fo-kien, in which he embarked 10,000 men. This fleet ſet ſail, and arrived in ſafety at the port of Napa-kiang. The army, in ſpite of every effort made by the natives, landed on the iſland; and the king, who had put himſelf at the head of his troops to oppoſe the enemy, having fallen in battle, the Chineſe pillaged, ſacked, and burnt the royal city, made more than 5000 ſlaves, and returned to China.

The emperors of the dynaſty of Tang, thoſe of the ſhort dynaſties that followed, and thoſe of the dynaſty of Song, although they were fully informed of every thing reſpecting the Lieou-kieou iſles, made no attempts to render them tributary. In 1291, Chi-tſou, emperor of the dynaſty of Yven, was deſirous of reviving the pretenſions of his predeceſſors. He fitted out a fleet to ſubdue theſe iſlands; but ſchemes of conqueſt had become diſagreeable to the Chineſe, ſince the diſaſter that befel their army in an expedition againſt Japan. The fleet of Chi-tſou went no farther than the iſles of Pong-hou, and the weſtern coaſt of Formoſa, from whence, under divers pretences, they returned to the ports of Fo-kien.

It was only in 1372, under the reign of Hong-vou, founder of the dynaſty of Ming, that theſe iſlands ſubmitted voluntarily to the Chineſe government. Hong-vou had ſent one of the grandees of his court to Tſay-tou, who was then reigning at Lieou-kieou, to inform him of his acceſſion to the throne. The Chineſe nobleman had received particular inſtructions reſpecting this commiſſion, and he acquitted himſelf of it with all the prudence and addreſs of an able miniſter. In a private audience which he had with Tſay-tou, he exhorted this prince to declare himſelf a tributary of the empire, and laid before him the advantages he would derive from this ſtep. His reaſoning, ſupported by the power of his natural eloquence, made ſo much impreſſion on the mind of Tſay-tou, that he embraced the propoſal made him, and ſent immediately to the emperor to demand the inveſtiture of his ſtates.

Hong-vou received his envoys in a magnificent manner, and loaded them with preſents. He ſolemnly declared Tſay-tou a vaſſal of the empire; and, after having received his firſt tribute (which conſiſted in valuable horſes, aromatic wood, ſulphur, copper, tin, &c. he ſent to this prince a golden ſeal, and confirmed the choice he had made of one of his ſons for ſucceſſor. The emperor afterwards ſent 36 families, almoſt all from the province of Fo-kien to Lieou-kieou. Tſay-tou received them, aſſigned them lands near the port of Napa-kiang, and appointed certain revenues for their uſe, at the ſame time that Hong-vou made them conſiderable remittances. Theſe families firſt introduced into Lieou-kieou the learned language of the Chineſe, the uſe of their characters, and the ceremonies practiſed in China in honour of Confucius. On the other hand, the ſons of ſeveral of the grandees of the court of Tſay-tou were ſent to Nan-king, to ſtudy Chineſe in the imperial college, where they were treated with diſtinction, and maintained at the emperor's expences.

The iſles of Lieou-kieou had neither iron nor porcelain. Hong-vou ſupplied this want; he cauſed a great number of utenſils of iron and inſtruments to be made, which he ſent thither, together with a quantity of porcelain veſſels. Commerce, navigation, and the arts ſoon began to flouriſh. Theſe iſlanders learned to caſt bells for their temples, to manufacture paper and the fineſt ſtuffs, and to make porcelain, with which they had been ſupplied before from Japan.

The celebrated revolution which placed the Tartars on the imperial throne of China, produced no change in the conduct of the kings of Lieou kieou. Chang-tché, who was then reigning, ſent ambaſſadors to acknowledge Chun-tchi, and received a ſeal from him, on which were engraven ſome Tartar characters. It was then ſettled, that the king of Lieou-kieou ſhould pay his tribute only every two years, and that the number of perſons in the train of his envoys ſhould not exceed 150.

The emperor Kang-hi ſeemed to pay more attention to theſe iſles than any of his predeceſſors. He cauſed a ſuperb palace to be erected in honour of Confucius, and a college where he maintained maſters to teach the ſciences and the Chineſe characters. He alſo inſtituted examinations for the different degrees of the literati. He ordained, that the king of Lieou-kieou ſhould never ſend in tribute roſe-wood, cloves, or any other production which was not really of the growth of the country; but that he ſhould ſend a fixed quantity of ſulphur, copper, tin, ſhells, and mother of pearl, which is remarkably pretty in theſe iſlands. He permitted, that, beſides the uſual tribute, he might preſent him horſe-furniture, piſtol-caſes, and other things of the ſame kind, which theſe iſlanders are ſaid to manufacture with great taſte and neatneſs.

It is more than 900 years ſince the bonzes of China introduced at Lieou-kieou the worſhip of Fo, and the principal books belonging to their ſect. This worſhip is at preſent the eſtabliſhed religion both of the grandees and of the people. There is ſtill to be ſeen in the royal city a magnificent temple, erected in honour of another idol borrowed from the Chineſe, named *Tein-fey*, which ſignifies *celeſtial queen* or *lady*.

Theſe iſlanders do not make promiſes or ſwear before their idols. When they have occaſion to do this, they burn perfumes, preſent fruits, and ſtand reſpectfully before ſome ſtone, which they call to witneſs the ſolemnity of their engagements. Numbers of ſtones are to be ſeen in the courts of their temples, in moſt public places, and upon their mountains, which are entirely appropriated to this purpoſe. They have alſo among them women conſecrated for the worſhip of ſpirits, who are ſuppoſed to have great influence over theſe beings. They viſit the ſick, diſtribute medicines, and recite prayers for their recovery.

They reſpect the dead as much as the Chineſe, and they are no leſs ceremonious in wearing mourning; but their funerals are neither ſo pompous, nor attended with ſo much expence. Their coffins, which are of an hexagonal or octagonal figure, are three or four feet high. They burn the fleſh of the bodies of their dead, and preſerve only the bones. They never offer proviſions to them; they are contented with placing lamps round them, and burning perfumes.

Different families are diſtinguiſhed in Lieou-kieou by ſurnames, as in China; but a man and a woman of the ſame ſurname cannot be united in marriage. The king is not permitted to marry but in the three grand families, which always enjoy the higheſt offices. There is a fourth, of equal diſtinction to the three former; but neither the king nor the princes contract any alliances with this family; for it is doubtful whether it be not ſprung from the ſame ſtem as the royal line.

A plurality of wives is allowed in theſe iſles. Young men and young women enjoy the liberty of ſeeing one another, and of converſing together; and their union is always in conſequence of their own choice. The women are very reſerved; they never uſe paint, and wear no pendants in their ears; they collect their hair on the top of their heads in the form of a curl, and fix it in that manner by means of long pins made of gold or ſilver.

Beſides the vaſt domains which the king poſſeſſes, he receives the produce of all the ſulphur, copper, and tin mines, and of the ſalt pits, together with what ariſes from taxes. From theſe revenues he pays the ſalaries of the mandarins and officers of his court. Theſe ſalaries are eſtimated at a certain number of ſacks of rice; but under this name is comprehended whatever the king gives in grain, rice, ſilk, cloth, &c. The whole is valued according to the price of the ſacks of rice.

There are here, as in China, nine orders of mandarins, who are diſtinguiſhed by the colour of their caps, or by their girdles and cuſhions. The greater part of the titles of theſe mandarins are hereditary in their families; but there are ſome which are only beſtowed upon merit. In the royal city there are tribunals eſtabliſhed

Lieutaud, Lieutenant.

bliſhed for managing the revenue and affairs of the principal iſland, and of all the others which are dependent on it. The latter have agents, who reſide at court. There are alſo particular tribunals for civil and criminal matters; for whatever concerns the families of the grandees and princes; for the affairs of religion; for inſpecting the public granaries, king's revenues, duties; for commerce, manufactures, civil ceremonies, and for navigation, public edifices, literature, and war.

The veſſels that are built in this country are greatly valued by the people of China and Japan. In theſe the natives go not only from one iſland to another, but alſo to China, Tong-king, Cochin-China, Corea, Nangaza-ki, Satſuma, the neighbouring iſles, and to Formoſa, where they diſpoſe of their different commodities. Beſides thoſe articles of commerce which their manufactures of ſilk, cotton, paper, arms, copper utenſils, &c. furniſh them, they alſo export mother of-pearl, tortoiſe and other ſhells, coral and whetſtones, which are in great requeſt both in China and Japan.

LIEUTAUD, Dr Joseph, counſellor of ſtate and firſt phyſician at the court of France, was born at Aix in Provence, and reſided principally there till he took the degree of doctor of medicine. After this he proſecuted his ſtudies for ſome years at Montpelier. He returned to Aix, where he ſoon acquired extenſive practice, and became eminent for literary abilities. He reſided there till the year 1750, when he was invited to act as phyſician to the royal infirmary at Verſailles. There he practiſed with ſuch reputation and ſucceſs, that he ſoon arrived at the head of his profeſſion; and in the year 1774, upon the death of M. Senac, he was appointed archiater. His extenſive engagements in practice did not prevent him from cultivating the ſcience of medicine in all its branches, and from freely communicating to others the reſult of his own ſtudies. He publiſhed many valuable works; amongſt which the following may be accounted the moſt remarkable. 1. *Elementa Phyſiologiæ.* 2. *Precis de la Medicine.* 3. *Pratique Precis de la Matiere Medicale.* 4. *Eſſais Anatomiques.* 5. *Synopſis Univerſæ Praxeos Medicinæ.* 6. *Hiſtoria Anatomico-Medica.* He died at Verſailles in 1780, aged 78 years.

LIEUTENANT, an officer who ſupplies the place and diſcharges the office of a ſuperior in his abſence. Of theſe, ſome are civil, as the lords-lieutenants of kingdoms, and the lords-lieutenants of counties; and others are military, as the lieutenant-general, lieutenant-colonel, &c.

Lord-Lieutenant of Ireland, is properly a viceroy; and has all the ſtate and grandeur of a king of England, except being ſerved upon the knee. He has the power of making war and peace, of beſtowing all the offices under the government, of dubbing knights, and of pardoning all crimes except high treaſon; he alſo calls and prorogues the parliament, but no bill can paſs without the royal aſſent. He is aſſiſted in his government by a privy council; and, on his leaving the kingdom, he appoints the lords of the regency, who govern in his abſence.

Lords-Lieutenants of Counties, are officers, who upon any invaſion or rebellion, have power to raiſe the militia, and to give commiſſions to colonels and other officers, to arm and form them into regiments, troops, and companies. Under the lords-lieutenants, are deputy-lieutenants, who have the ſame power: theſe are choſen by the lords lieutenants, out of the principal gentlemen of each county, and preſented to the king for his approbation.

Lieutenant.

Lieutenant-Colonel. See Colonel.

Lieutenant-General. See General.

Lieutenant, in the land ſervice, is the ſecond commiſſioned officer in every company of both foot and horſe, and next to the captain, and who takes the command upon the death or abſence of the captain.

Lieutenant of Artillery. Each company of artillery hath four; 1 firſt and 3 ſecond lieutenants. The firſt lieutenant hath the ſame detail of duty with the captain, becauſe in his abſence he commands the company: he is to ſee that the ſoldiers are clean and neat; that their clothes, arms, and accoutrements, are in good and ſerviceable order; and to watch over every thing elſe which may contribute to their health. He muſt give attention to their being taught the exerciſe, ſee them punctually paid, their meſſes regularly kept, and to viſit them in the hoſpitals when ſick. He muſt aſſiſt at all parades, &c. He ought to underſtand the doctrine of projectiles and the ſcience of artillery, with the various effects of gunpowder, however managed or directed; to enable him to conſtruct and diſpoſe his batteries to the beſt advantage; to plant his cannon, mortars, and howitzers, ſo as to produce the greateſt annoyance to an enemy. He is to be well ſkilled in the attack and defence of fortified places; and to be converſant in arithmetic, mathematics, mechanics, &c.

Second Lieutenant in the Artillery, is the ſame as an enſign in an infantry regiment, being the youngeſt commiſſioned officer in the company, and muſt aſſiſt the firſt lieutenant in the detail of the company's duty. His other qualifications ſhould be equal with thoſe of the firſt lieutenant.

Lieutenant of a Ship of War, the officer next in rank and power to the captain, in whoſe abſence he is accordingly charged with the command of the ſhip, as alſo the execution of whatever orders he may have received from the commander relating to the king's ſervice.

The lieutenant who commands the watch at ſea, keeps a liſt of all the officers and men thereto belonging, in order to muſter them when he judges it expedient, and report to the captain the names of thoſe who are abſent from their duty. During the night watch, he occaſionally viſits the lower decks, or ſends thither a careful officer, to ſee that the proper centinels are at their duty, and that there is no diſorder amongſt the men; no tobacco ſmoked between decks, nor any fire or candles burning there, except the lights which are in lanthorns, under the care of a proper watch, on particular occaſions. He is expected to be always upon deck in his watch, as well to give the neceſſary orders with regard to trimming the ſails and ſuperintending the navigation, as to prevent any noiſe or confuſion; but he is never to change the ſhip's courſe without the captain's directions, unleſs to avoid an immediate danger.

The lieutenant, in time of battle, is particularly to ſee that all the men are preſent at their quarters, where they have been previouſly ſtationed according to the regulations made by the captain. H

Lieutenant, Life. and exhorts them everywhere to perform their duty, and acquaints the captain at all other times of the miſbehaviour of any perſon in the ſhip, and of whatever elſe concerns the ſervice or diſcipline.

The youngeſt lieutenant in the ſhip, who is alſo ſtyled *lieutenant at arms*, beſides his common duty, is particularly ordered, by his inſtructions, to train the ſeamen to the uſe of ſmall arms, and frequently to exerciſe and diſcipline them therein. Accordingly his office, in time of battle, is chiefly to direct and attend them; and at all other times to have a due regard to the preſervation of the ſmall arms, that they be not loſt or embezzled, and that they are kept clean and in good condition for ſervice.

LIEUTENANT-Reformed, he whoſe company or troop is broke or diſbanded, but continued in whole or half pay, and ſtill preſerves his right of ſeniority and rank in the army.

LIFE, is peculiarly uſed to denote the animated ſtate of living creatures, or the time that the union of their ſoul and body laſts.

The Prolongation of LIFE is made by Lord Bacon one of the three branches of medicine; the other two relating to the preſervation of health, and the cure of diſeaſes. See MEDICINE.

The theory of prolonging life he numbers among the deſiderata. Some means or indications that ſeem to lead to it, he lays down as follow:

Things are preſerved in two manners; either in their *identity*, or by *reparation*. In their *identity;* as a fly or ant in amber; a flower, or fruit, or wood, in a conſervatory of ſnow; a dead carcaſe in balſams. By *reparation;* as a flame, or a mechanical engine, &c. To attain to the prolongation of life, both theſe methods muſt be uſed. And hence, according to him, ariſe three intentions for the prolongation of life; *Retardation* of conſumption, proper *reparation*, and *renovation* of what begins to grow old.

Conſumption is occaſioned by two kinds of depredation; a depredation of the innate ſpirit, and a depredation of the ambient air. Theſe may be each prevented two ways; either by rendering thoſe agents leſs predatory, or by rendering the paſſive parts (viz. the juices of the body), leſs liable to be preyed on. The ſpirit will be rendered leſs predatory, if either its ſubſtance be condenſed, as by the uſe of opiates, grief, &c.; or its quantity diminiſhed, as in ſpare and monaſtic diets; or its motion calmed, as in idleneſs and tranquillity. The ambient air becomes leſs predatory, if it be either leſs heated by the rays of the ſun, as in cold climates, in caves, mountains, and anchorets cells; or be kept off from the body, as by a denſe ſkin, the feathers of birds, and the uſe of oils and unguents without aromatics. The juices of the body are rendered leſs liable to be preyed on, either by making them harder or more moiſt and oily; harder, as by a coarſe ſharp diet, living in the cold, robuſt exerciſes, and ſome mineral baths: moiſter, as by the uſe of ſweet foods, &c. abſtaining from ſalts and acids; and eſpecially by ſuch a mixture of drink as conſiſts wholly of fine ſubtile particles, without any acrimony or acidity.

Reparation is performed by means of aliment; and alimentation is promoted four ways: By the concoction of the viſcera, ſo as to extrude the aliment: By exciting the exterior parts to the attraction of the aliment; as in proper exerciſes and frications, and ſome unctions and baths: By the preparation of the food itſelf, ſo as it may more eaſily inſinuate itſelf, and in ſome meaſure anticipate the digeſtion; as in various ways of dreſſing meats, mixing drinks, fermenting breads, and reducing the virtues of theſe three into one: By promoting the act of aſſimilation itſelf, as in ſeaſonable ſleep, ſome external application, &c.

The *renovation* of what begins to grow old, is performed two ways: By the inteneration of the habit of the body; as in the uſe of emollients, emplaſters, unctions, &c. of ſuch a nature, as do not extract but impreſs: Or by purging off the old juices, and ſubſtituting freſh ones; as in ſeaſonable evacuations, attenuating diets, &c.

The ſame author adds theſe three axioms: That the prolongation of life is to be expected, rather from ſome ſtated diets, than either from any ordinary regimen or any extraordinary medicines; more from operating on the ſpirits, and mollifying the parts, than from the manner of feeding; and this mollifying of the parts without is to be performed by ſubſtantials, impriments, and occludents. See LONGEVITY.

Life-Boat. *LIFE-Boat*, a moſt important invention, conſiſting in an improvement of the ordinary conſtruction of a boat, by which it cannot be ſunk in the rougheſt ſea; ſo that it is peculiarly fitted for bringing off mariners from wrecks during a ſtorm, and thus ſaving many valuable lives. The life-boat was firſt conceived at South Shields, in the county of Durham. A committee of the inhabitants of that town, who had often been the ſad witneſſes of many melancholy ſhipwrecks in which by the ordinary means no relief could be given, in a public advertiſement requeſted information on this ſubject, with models of boats which would be moſt proper for the purpoſe of ſaving perſons from ſhipwreck. The committee it would appear, employed Mr Greathead, a boat-builder in South Shields, who had with others preſented the model of a boat for this purpoſe, to build the firſt boat, which upon trial was found fully to anſwer the purpoſe. Two claimants have ſince appeared for the honour of the invention, which according to Mr Farles, the chairman of the committee, in his letter to Mr Hails the ſupporter of one claim, belongs to two of the members themſelves, namely Mr Farles himſelf and Mr Rockwood. The claimants above alluded to are Mr Greathead, and a Mr Wouldhave a painter in South Shields, and a very ingenious man, who alſo preſented a model to the committee. The claim of the latter is keenly ſupported by Mr Hails, in a pamphlet publiſhed in 1806, two years after Mr Greathead's pamphlet containing the hiſtory and progreſs of the invention, and of the boats which he had built for the purpoſe, his application to parliament, and the premium of 1200l. which he received for the invention, &c. and four years after this application to parliament. It is true that in 1802, Mr Wouldhave and his friends aſſerted his claim in the Monthly Magazine and in ſome provincial newſpapers; but ſtill this was one year after Mr Greathead's application for reward was made to parliament. But, without being at all underſtood to decide to whom the merit of the invention is due, we ſhall leave it to our readers to examine the evidence for themſelves, and ſhall now proceed to give an account of the conſtruction of the life-boat, of which 31 have been built by

Life-Boat.

Mr Greathead, and ſent to different parts of Britain, and the north of Europe. The following conſtruction is according to Mr Greathead's plan:

"The length thirty feet; the breadth ten feet; the depth, from the top of the gunwale to the lower part of the keel in midſhips, three feet four inches; from the gunwale to the platform (within) two feet four inches; from the top of the ſtems (both ends being ſimilar) to the bottom of the keel, five feet nine inches. The keel is a plank of three inches thick, of a proportionate breadth in midſhips, narrowing gradually toward the ends, to the breadth of the ſtems at the bottom, and forming a great convexity downward; the ſtems are ſegments of a circle with conſiderable rakes; the bottom ſection, to the floor heads, is a curve fore and aft with the ſweep of the keel; the floor timber has a ſmall riſe curving from the keel to the floor heads; a bilge plank is wrought in on each ſide next the floor heads, with a double rabbit or groove of a ſimilar thickneſs with the keel, and on the outſide of this are fixed two bilge-trees correſponding nearly with the level of the keel; the ends of the bottom ſection form that fine kind of entrance obſervable in the lower part of the bow of the fiſhing boat called a *coble*, much uſed in the north; from this part to the top of the ſtem, it is more elliptical, forming a conſiderable projection; the ſides from the floor heads to the top of the gunwale, flaunch off on each ſide, in proportion to about half the breadth of the floor; the breadth is continued far forward toward the ends, leaving a ſufficient length of ſtraight ſide at the top; the ſheer is regular along the ſtraight ſide, and more elevated toward the ends; the gunwale fixed on the outſide is three inches thick; the ſides, from the under part of the gunwale along the whole length of the regular ſheer, extending twenty-one feet ſix inches, are caſed with layers of cork, to the depth of 16 inches downward; and the thickneſs of this caſing of cork being four inches, it projects at the top a little without the gunwale; the cork on the outſide is ſecured with thin plates or ſlips of copper, and the boat is faſtened with copper nails; the thwarts (or ſeats) are five in number, double banked, conſequently the boat may be rowed with ten oars; the thwarts are firmly ſtanchioned; the ſide oars are ſhort (A), with iron tholes, and rope grommets, ſo that the rower can pull either way. The boat is ſteered with an oar at each end; and the ſteering oar is one-third longer than the rowing oar; the platform placed at the bottom within the boat, is horizontal the length of the midſhips, and elevated at the ends, for the convenience of the ſteerman, to give him a greater power with the oar. The internal part of the boat next the ſides, from the under part of the thwarts down to the platform, is caſed with cork; the whole quantity of which, affixed to the life-boat, is nearly ſeven hundred weight; the cork indiſputably contributes much to the buoyancy of the boat when full of water, is a good defence when going alongſide a veſſel, and is of principal uſe in keeping the boat in an erect poſition in the ſea, or rather of giving her a very lively and quick diſpoſition to recover from any ſudden cant or lurch which ſhe may receive from the ſtroke of a heavy wave: but, excluſive of the cork, the admirable conſtruction of this boat gives it a decided pre-eminence. The ends being ſimilar, the boat can be rowed either way, and this peculiarity of form alleviates her in riſing over the waves; the curvature of the keel and bottom facilitates her movement in turning, and contributes to the eaſe of the ſteerage, as a ſingle ſtroke of the ſteering oar has an immediate effect, the boat moving as it were upon a centre; the fine entrance below is of uſe in dividing the waves, when rowing againſt them; and combined with the convexity of the bottom and the elliptical form of the ſtem, admits her to riſe with wonderful buoyancy in a high ſea, and to launch forward with rapidity, without ſhipping any water, when a common boat would be in danger of being filled. The flaunching or ſpreading form of the boat, from the floor heads to the gunwale, gives her a conſiderable bearing; and the continuation of the breadth well forward, is a great ſupport to her in the ſea; and it has been found by experience that boats of this conſtruction are the beſt ſea boats for rowing againſt the turbulent waves. The internal ſhallowneſs of the boat from the gunwale down to the platform, the convexity of the form, and the bulk of cork within, leave a very diminiſhed ſpace for the water to occupy; ſo that the life boat, when filled with water, contains a conſiderably leſs quantity than the common boat, and is in no danger either of ſinking or overturning.

Life-Boat.

It may be preſumed by ſome, that in caſes of high wind, agitated ſea, and broken waves, a boat of ſuch a bulk could not prevail againſt them by the force of the oars; but the life-boat, from her peculiar form, may be rowed a-head, when the attempt in other boats would fail (B). Boats of the common form, adapted for ſpeed, are of courſe put in motion with a ſmall power; but for want of buoyancy and bearing, are overrun by the waves and ſunk, when impelled againſt them: and boats conſtructed for burthen, meet with too much reſiſtance from the wind and ſea, when oppoſed to them, and cannot in ſuch caſes be rowed from the ſhore to a ſhip in diſtreſs. An idea has been entertained that the ſuperior advantages of the life-boat are to be aſcribed ſolely to the quantity of cork affixed; but this is a very erroneous opinion, and I truſt has been amply refuted by the preceding obſervations on the conſtruction of this boat. It muſt be admitted that the application of cork to common boats would add to their buoyancy and ſecurity; and it might be a uſeful expedient, if there was a quantity of cork on board of ſhips, to prepare the boats with, in caſes of ſhipwreck, as it might be expeditiouſly done in a temporary way, by means of clamps, or ſome other contrivance. The application of cork to ſome of the boats of his majeſty's ſhips (the launches) might be worthy of conſideration, more particularly, as an experiment might be made at a little expence, and without injury to the boats.

"The life-boat is kept in a boat-houſe, and placed upon

(A) The ſhort oar is more manageable, in a high ſea, than the long oar, and its ſtroke is more certain.

(B) An extraordinary caſe might certainly happen, when a forcible combination of the wind, the waves, and the tide, might render it impracticable to row the life-boat from the ſhore.

Life-Boat.

upon four low wheels, ready to be moved at a moment's notice. Theſe wheels are convenient in conveying the boat along the ſhore to the ſea; but if ſhe had to travel upon them, on a rough road, her frame would be exceedingly ſhaken; beſides, it has been found difficult and troubleſome to replace her upon theſe wheels, on her return from ſea.

"Another plan has therefore been adopted: two wheels of 12 feet diameter, with a moveable arched axis, and a pole fixed thereto, for a lever, have been conſtructed. The boat is ſuſpended, near her centre, between the wheels, under the axis; toward each extremity of which is an iron pin. When the pole is elevated perpendicularly, the upper part of the axis becomes depreſſed, and a pair of rope ſlings, which go round the boat, being fixed to the iron pins, ſhe is raiſed with the greateſt facility, by means of the pole, which is then faſtened down to the ſtem of the boat."

Temporary Life-Boat,—an invention by the reverend Mr Bremner miniſter of Walls and Flota in Orkney, by which any ordinary ſhips boat may be converted into a life-boat, ſo that in caſes of ſhipwreck, the crew may be ſaved by means of their own boats. Mr Bremner ſtates, in deſcribing his plan to the Highland Society of Scotland, that it had received the approbation of the Trinity houſes of London and Leith, of the Royal Humane Society of London, and of many captains of merchantmen. An experiment was made in the port of Leith under the ſuperintendance of Mr Bremner himſelf, and in preſence of a committee of the directors of the ſociety. This experiment proved ſatisfactory to the committee, whoſe favourable report to the directors induced them to preſent Mr Bremner with a piece of plate in teſtimony of their approbation of his ſcheme. The following is a general deſcription of the method of preparing a boat for this purpoſe.

"The dimenſions of the ſloop's boat, with which the experiment was tried, were 14 feet in length, 5 feet 4 inches in width, and 2 feet 2 inches in depth. The only addition or previous preparation of the boat, was four ring bolts in the inſide, and two auger bores or holes in the outſide of the keel, as points of ſecurity for fixing the neceſſary ſeizing ropes (c). The ring bolts, within ſide the keel, were placed, the one forward, one-third from the ſtem, the other aft, one-third from the ſtern; the other two, the one directly at the ſtem, the other at the ſtern. The auger bores, outſide the keel, being half way betwixt the rings, viz. the one betwixt the two rings forward, the other betwixt the two rings aft.

"Two empty hogſheads were then placed in the fore part of the boat, parallel and cloſe to each other, and laid lengthways, fore and aft. Theſe were ſecured in their places by paſſing the ſeizing ropes round all, that is, over the gunwales and through the auger bore in the keel, as alſo from the ring bolt in the ſtem to that next it in the keel, taking care in doing this, to paſs the rope alſo through eyes on the ſlings of the caſks, which had been previouſly prepared. The ſame proceſs was obſerved in the after part of the boat. And laſtly, a bar of iron about three hundred weight, was fixed to the keel, on the inſide. A ſmall quantity of cork was alſo placed in the ſtern, intended chiefly to raiſe to a proper height the caſks placed above it, but without which the reſult of the experiment would have been the ſame.

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"The quantity of cork neceſſary, which will depend on the ſize of the boat, is to be made up into ſeveral parcels, but none larger than one perſon can eaſily manage. Each parcel to be properly ſecured and numbered, ſo as that the whole may fit and fill up the boat completely, in the ſpaces betwixt the ring bolts, fore and aft, as above deſcribed; and to anſwer the end, it is material that there ſhould be cork enough to riſe nearly three feet above the gunwales, ſo as to form an arch from gunwale to gunwale. The cork being thus laid in the boat, it is to be properly ſecured, firſt by paſſing a ſtrong rope round all, over the gunwales, and through the auger bore, outſide the keel; as alſo by paſſing ſeizing ropes from the ring bolt in the ſtem, to that next it in the keel, taking care to make as many turns and ſeizings betwixt theſe ring bolts, as completely to ſecure the cork from ſlipping out. The very ſame thing to be done as to the rope round the gunwales, and through the hole outſide the keel, with ſeizing ropes from the ring bolts, to be made aft, or in the ſtern of the boat.

"Where cork cannot be had, or may not be kept in readineſs on account of its expence, which, however, is not very great, caſks will anſwer the purpoſe, though it may be doubtful whether there would not be a greater chance that the fury of the waves might unlooſe them, unleſs particular care was taken to have them properly fixed. In the caſe of caſks, two empty ones are to be placed in the fore part of the boat, parallel to one another, cloſe together, and to be laid lengthwiſe fore and aft. Two other empty caſks to be placed in the ſame way in the ſtern, or aft part of the boat, and the whole to be ſecured as firmly and compactly as poſſible, by ſtrong ropes round the boat and caſks, and alſo by ſeizing ropes in the ſame way as deſcribed in the caſe of cork; then two other empty caſks, of the ſame dimenſions, one fore, and another aft, to be placed over and in the middle between the two already fixed, and to be firmly ſecured, as above-mentioned.

"As the boat is to be thus prepared on the deck of the ſhip, when danger appears, a piece of ſail ſhould be thrown in below, betwixt, and about the caſks, for the more effectually ſecuring them, and to prevent the ſeizing ropes from ſo readily ſlipping; it would be proper alſo to have ſlings on the caſks, with eyes in them, through which to paſs the ſeizing ropes.

"Laſtly, both in the caſe of cork and caſks, an iron bar, of about three hundred weight, for ſuch a boat as above deſcribed, ſhould be ſecured to the keel on the inſide, in the middle or empty ſpace. This middle, or empty ſpace of the boat, is for the ſailors, and in a ſhip's boat of the common ſize may hold eight people, with room to work a pair of oars. Every thing being previouſly ready, it is certain that the neceſſary fixing of the caſks will not take up above ten or twelve minutes, and it is obvious the cork can be fixed in a much ſhorter period. It is alſo completely aſcertained, that a boat ſo prepared, though full of water, will not ſink, but on the contrary be extremely buoyant, and will eaſily go a-head: That it would be next to impoſſible the boat ſhould overſet; but, in caſe of this at any time happening, ſhe would inſtantly return to her proper poſition on her keel. Though the experiment was tried only with caſks, with but a ſmall quantity of cork, as before ſtated, yet it is generally believed, and and Mr Bremner himſelf is of the ſame opinion, that it might anſwer equally well, and perhaps better, to have the cork or caſks ſtowed in midſhips, leaving an empty ſpace in each end, by which means the management of the boat by the helm or rudder would be preſerved, though the other plan ſeems better, in the view of uſing oars.

(c) It is probable, that ring bolts fixed in the gunwales, might anſwer as well as paſſing the ropes round the bottom of the boat and through the auger bores in the keel.

Vegetable Life. See Plants.

Life-Rent, in *Scots Law.* When the uſe and enjoyment of a ſubject is given to a perſon during his life, it is ſaid to belong to him in life-rent.

LIGAMENT, in its general ſenſe, denotes any thing that ties or binds one part to another.

Ligament, in *Anatomy*, a ſtrong compact ſubſtance, ſerving to join two bones together. See Anatomy, N° 7.

LIGARIUS, Quintus, a Roman proconſul in Africa, 49 B. C. Taking part with Pompey, he was forbid by Julius Cæſar to return to Rome: to obtain his pardon, Cicero made that admired oration in his defence, which has immortalized the memory of the client with that of his celebrated advocate.

LIGATURE, in *Surgery*, is a cord, band, or ſtring; or the binding any part of the body with a cord, band, fillet, &c. whether of leather, linen, or any other matter.

Ligatures are uſed to extend or replace bones that are broken or diſlocated; to tie the patients down in lithotomy and amputations; to tie upon the veins in phlebotomy, on the arteries in amputations, or in large wounds; to ſecure the ſplints that are applied to fractures; to tie up the proceſſes of the peritonæum with the ſpermatic veſſels in caſtration; and, laſtly, in taking off warts or other excreſcences by ligature.

Ligature, is alſo uſed to ſignify a kind of bandage or fillet, tied round the neck, arm, leg, or other part of the bodies of men or beaſts, to divert or drive off ſome diſeaſe, accident, &c.

Ligature, is alſo uſed for a ſtate of impotency, in reſpect to venery, pretended to be cauſed by ſome charm or witchcraft.

Kæmpfer tells of an uncommon kind of ligature or knotting, in uſe among the people of Macaſſar, Java, Malacca, Siam, &c. By this charm or ſpell, a man binds up a woman, and a woman a man, ſo as to put it out of their power to have to do with any other perſon; the man being thereby rendered impotent to any other woman, and all other men impotent with reſpect to the woman.

Some of their philoſophers pretend, that this ligature may be effected by the ſhutting of a lock, the drawing of a knot, or the ſticking of a knife in the wall, at the point of time wherein the prieſt is joining a couple together; and that a ligature, thus effected, may be diſſolved, by the ſpouſe's urining through a ring. This piece of ſuperſtition is ſaid to obtain alſo among the Chriſtians of the Eaſt.

The ſame author tells us, that during the ceremony of marriage in Ruſſia, he obſerved an old fellow lurking behind the church-door, and mumbling over a ſtring of words; and, at the ſame time, cutting a long rod, which he held under his arm into pieces; which, it ſeems, is a common practice at the marriages of great perſons, and done with deſign to elude and counterwork any other perſon that might poſſibly be inducing the ligature.

The ſecret of inducing a ligature is delivered by the ſame author, as he was taught it on the ſpot by one of their adepts: but it is too abſurd and obſcene to deſerve being tranſcribed here.

M. Marſhal mentions a ridiculous form of ligature, which he received from a bramin of Indoſtan: "If (ſays he) the little worm in the wood lukerara kara be cut into two, and the one part ſtirs and the other not, if the ſtirring part be bruiſed, and given with half a beetle to a man, and the other half to a woman, the charm will keep each from ever having to do with any other perſon. Phil. Tranſ. N° 268.

Ligature, in the Italian muſic, ſignifies a tying or binding together of notes. Hence ſyncopes are often called *ligatures*, becauſe they are made by the ligature of many notes. There is another ſort of ligatures for breves, when there are many of theſe on different lines, or on different ſpaces, to be ſung to one ſyllable.

Ligatures, among printers, are types conſiſting of two letters or characters joined together; as *ct*, *&*, *ff*, *ſt*, *ſi*. The old editions of Greek authors are extremely full of ligatures; the ligatures of Stephens are by much the moſt beautiful.—Some editions have been lately printed without any ligatures at all; and there was a deſign to explode them quite out of printing. Had this ſucceeded, the fineſt ancient editions would in time have grown uſeleſs: and the reading of old manuſcripts would have been rendered almoſt impracticable to the learned themſelves.

LIGHT, in the moſt common acceptation of the word, ſignifies that inviſible etherial matter which makes objects perceptible to our ſenſe of ſeeing. Figuratively, it is alſo uſed for whatever conveys inſtruction to our minds, and likewiſe for that inſtruction itſelf.

For an account of the chemical properties of light, ſee Chemistry *Index;* and for its phyſical properties, ſee Optics.

Light independent of Heat. In general, a very conſiderable degree of heat is requiſite to the emiſſion of light from any body; but there are ſeveral exceptions to this, eſpecially in light proceeding from putreſcent ſubſtances and phoſphorus, together with that of luminous animals, and other ſimilar appearances. Light proceeding from putreſcent animal and vegetable ſubſtances, as well as from glow-worms, is mentioned by Ariſtotle. Thomas Bartholin mentions four kinds of luminous inſects, two with wings, and two without; but in hot climates travellers ſay they are found in much greater numbers, and of different ſpecies.

De luce [illegible] p. [illegible]

Light.

cies. Columna, an induſtrious naturaliſt, obſerves, that their light is not extinguiſhed immediately upon the death of the animal.

Light from putrid fleſh.

De Viſione, [illegible]

The firſt diſtinct account that we meet with of light proceeding from putreſcent animal fleſh is that which is given by Fabricius ab Aquapendente; who ſays, that when three Roman youths, reſiding at Padua, had bought a lamb, and had eaten part of it on Eaſter day 1562, ſeveral pieces of the remainder, which they kept till the day following, ſhone like ſo many candles when they were caſually viewed in the dark. Part of this luminous fleſh was immediately ſent to Aquapendente, who was profeſſor of anatomy in that city. He obſerved, that both the lean and the fat of this meat ſhone with a whitiſh kind of light; and alſo took notice, that ſome pieces of kid's fleſh, which had happened to have lain in contact with it, were luminous, as well as the fingers and other parts of the bodies of thoſe perſons who touched it. Thoſe parts, he obſerved, ſhone the moſt which were ſoft to the touch, and ſeemed to be tranſparent in candle light; but where the fleſh was thick and ſolid, or where a bone was near the outſide, it did not ſhine.

After this appearance, we find no account of any other ſimilar to it, before that which was obſerved by Bartholin, and of which he gives a very pompous deſcription in his ingenious treatiſe already quoted. This happened at Montpelier in 1641, when a poor old woman had bought a piece of fleſh in the market, intending to make uſe of it the day following. But happening not to be able to ſleep well that night, and her bed and pantry being in the ſame room, ſhe obſerved ſo much light come from the fleſh, as to illuminate all the place where it hung. A part of this luminous fleſh was carried as a curioſity to Henry Bourbon, duke of Condé, the governor of the place, who viewed it for ſeveral hours with the greateſt aſtoniſhment.

This light was obſerved to be whitiſh; and not to cover the whole ſurface of the fleſh, but certain parts only, as if gems of unequal ſplendour had been ſcattered over it. This fleſh was kept till it began to putrefy, when the light vaniſhed; which, as ſome religious people fancied, it did in the form of a croſs.

Works, vol. iii. p. 156.

It is natural to expect, that the almoſt univerſal experimental philoſopher Mr Boyle ſhould try the effect of his air-pump upon theſe luminous ſubſtances. Accordingly, we find that he did not fail to do it; when he preſently found that the light of rotten wood was extinguiſhed *in vacuo*, and revived again on the admiſſion of the air, even after a long continuance *in vacuo*; but the extinguiſhing of this light was not ſo complete immediately upon exhauſting the receiver, as ſome little time afterwards. He could not perceive, however, that the light of rotten wood was increaſed in condenſed air; but this, he imagined, might ariſe from his not being able to judge very well of the degree of light, through ſo thick and cloudy a glaſs veſſel as he then made uſe of; but we find that the light of a ſhining fiſh, which was put into a condenſing engine before the Royal Society, in 1668, was rendered more vivid by that means. The principal of Mr Boyle's experiments were made in October 1667.

Birch's hiſt. ii. 254.

This philoſopher attended to a great variety of circumſtances relating to this curious phenomenon. Among other things he obſerved, that change of air was not neceſſary to the maintenance of this light; for it continued a long time when a piece of the wood was put into a very ſmall glaſs hermetically ſealed, and it made no difference when this tube which contained the wood was put into an exhauſted receiver. This he alſo obſerved with reſpect to a luminous fiſh, which he put into water, and placed in the ſame circumſtances. He alſo found, that the light of ſhining fiſhes had other properties in common with that of ſhining wood; but the latter, he ſays, was preſently quenched with water, ſpirit of wine, a greater variety of ſaline mixtures, and other fluids. Water, however, did not quench all the light of ſome ſhining veal on which he tried it, though ſpirit of wine deſtroyed its virtue preſently.

Mr Boyle's obſervation of light proceeding from fleſh meat was quite caſual. On the 15th of February 1662, one of his ſervants was greatly alarmed with the ſhining of ſome veal, which had been kept a few days, but had no bad ſmell, and was in a ſtate very proper for uſe. The ſervant immediately made his maſter acquainted with this extraordinary appearance; and though he was then in bed, he ordered it to be immediately brought to him, and he examined it with the greateſt attention. Suſpecting that the ſtate of the atmoſphere had ſome ſhare in the production of this phenomenon, he takes notice, after deſcribing the appearance, that the wind was ſouth-weſt and bluſtering, the air hot for the ſeaſon, the moon was paſt its laſt quarter, and the mercury in the barometer was at $29\frac{1}{10}$th inches.

Birch, ii. 70.

Light from fiſhes.

Mr Boyle was often diſappointed in his experiments on ſhining fiſhes; finding that they did not always ſhine in the very ſame circumſtances, as far as he could judge, with others which had ſhined before. At one time that they failed to ſhine, according to his expectations, he obſerved that the weather was variable, and not without ſome days of froſt and ſnow. In general he made uſe of whitings, finding them the fitteſt for his purpoſe. In a diſcourſe, however, upon this ſubject at the Royal Society in 1681, it was aſſerted, that, of all fiſhy ſubſtances, the eggs of lobſters, after they had been boiled, ſhone the brighteſt. Olig. Jacobœus obſerves, that, upon opening a ſea-polypus, it was ſo luminous as to ſtartle ſeveral perſons who ſaw it; and he ſays, that the more putrid the fiſh was, the more luminous it grew. The nails alſo, and the fingers of the perſons who touched it, became luminous; and the black liquor which iſſued from the animal, and which is its bile, ſhone alſo, but with a very faint light.

Act. Hafn. vol. v. p. 282.

Mr Boyle draws a minute compariſon between the light of burning coals and that of ſhining wood or fiſh, ſhowing in what particulars they agree, and in what they differ. Among other things he obſerves, that extreme cold extinguiſhes the light of ſhining wood, as appeared when a piece of it was put into a glaſs tube, and held in a frigorific mixture. He alſo found that rotten wood did not waſte itſelf by ſhining, and that the application of a thermometer to it did not diſcover the leaſt degree of heat.

Of the pholas, a remarkably luminous fiſh.

There is a remarkable ſhell-fiſh called PHOLAS, which forms for itſelf holes in various kinds of ſtone, &c. That this fiſh is luminous, was noticed by Pliny; who obſerves, that it ſhines in the mouth of the perſon who eats it, and, if it touch his hands or clothes, makes them luminous. He alſo ſays that the light depends upon its moiſture. The light of this fiſh has furniſhed matter for various obſervations and experiments to M. Reaumur, and the Bolognian academicians, eſpecially Beccarius, who took ſo much pains with the ſubject of phoſphoreal light.

M. Reaumur obſerves, that, whereas other fiſhes give light when they tend to putreſcence, this is more luminous in proportion to its being freſh; that when they are dried, their light will revive if they be moiſtened either with freſh or ſalt water, but that brandy immediately extinguiſhes it. He endeavoured to make this light permanent, but none of his ſchemes ſucceeded.

The attention of the Bolognian academicians was engaged to this ſubject by M. F. Marſilius, in 1724, who brought a number of theſe fiſhes, and the ſtones in which they were encloſed, to Bologna, on purpoſe for their examination.

Com. Bonon. vol. ii. 132.

Beccarius obſerved, that though this fiſh ceaſed to ſhine when it became putrid; yet that in its moſt putrid ſtate, it would ſhine, and make the water in which it was immerſed luminous, when it was agitated. Galeatius and Montius found, that wine or vinegar extinguiſhed this light; that in common oil it continued ſome days; but in rectified ſpirit of wine or urine, hardly a minute.

In order to obſerve in what manner this light was affected by different degrees of heat, they made uſe of a Reaumur's thermometer, and found that water rendered luminous by theſe fiſhes increaſed in light till the heat arrived to 45 degrees; but that it then became ſuddenly extinct, and could not be revived.

In the experiments of Beccarius, a ſolution of ſea ſalt increaſed the light of the luminous water; a ſolution of nitre did not increaſe it quite ſo much. Sal ammoniac diminiſhed it a little, oil of tartar *per deliquium* nearly extinguiſhed it, and the acids entirely. This water poured upon freſh calcined gypſum, rock cryſtal, ceruſe, or ſugar, became more luminous. He alſo tried the effects of it when poured upon various other ſubſtances, but there was nothing very remarkable in them. Afterwards, uſing luminous milk, he found that oil of vitriol extinguiſhed the light, but that oil of tartar increaſed it.

This gentleman had the curioſity to try how differently coloured ſubſtances were affected by this kind of light; and having, for this purpoſe, dipped ſeveral ribbons in it, the white came out the brighteſt, next to this was the yellow, and then the green; the other colours could hardly be perceived. It was not, however, any particular colour, but only light that was perceived in this caſe. He then dipped boards painted with the different colours, and alſo glaſs tubes, filled with ſubſtances of different colours, in water rendered luminous by the fiſhes. In both theſe caſes the red was hardly viſible, the yellow was the brighteſt, and the violet the dulleſt. But on the boards the blue was nearly equal to the yellow, and the green more languid; whereas in the glaſſes, the blue was inferior to the green.

Of all the liquors into which he put the pholades, milk was rendered the moſt luminous. A ſingle pholas made ſeven ounces of milk ſo luminous, that the faces of perſons might be diſtinguiſhed by it, and it looked as if it was tranſparent.

Air appeared to be neceſſary to this light; for when Beccarius put the luminous milk into glaſs tubes, no agitation would make it ſhine, unleſs bubbles of air were mixed with it. Alſo Montius and Galeatius found, that, in an exhauſted receiver, the pholas loſt its light, but the water was ſometimes made more luminous; which they aſcribed to the riſing of bubbles of air through it.

Beccarius, as well as Reaumur, had many ſchemes to render the light of theſe pholades permanent. For this purpoſe he kneaded the juice into a kind of paſte, with flour, and found that it would give light when it was immerſed in warm water; but it anſwered beſt to preſerve the fiſh in honey. In any other method of preſervation, the property of becoming luminous would not continue longer than ſix months, but in honey it had laſted above a year; and then it would, when plunged in warm water, give as much light as ever it had done.

Acta Cæſarenſia, vol. v. p. 485.

Similar, in ſome reſpects, to thoſe obſervations on the light of the pholas, was that which was obſerved to proceed from wood which was moiſt, but not in a putrid ſtate, which was very conſpicuous in the dark.

Light from ſea water.

That the ſea is ſometimes luminous, eſpecially when it is put in motion by the daſhing of oars or the beating of it againſt a ſhip, has been obſerved with admiration by a great number of perſons. Mr Boyle, after reciting all the circumſtances of this appearance, as far as he could collect them from the accounts of navigators; as its being extended as far as the eye could reach, and at other times being viſible only when the water was daſhed againſt ſome other body; that, in ſome ſeas, this phenomenon is accompanied by ſome particular winds, but not in others; and that ſometimes one part of the ſea will be luminous, when another part, not far from it, will not be ſo; concludes with ſaying, that he could not help ſuſpecting that theſe odd phenomena, belonging to great maſſes of water, were in ſome meaſure owing to ſome coſmical law or cuſtom of the terreſtrial globe, or at leaſt of the planetary vortex.

Dr Beale's experiments on fiſhes.

Some curious obſervations on the ſhining of ſome fiſhes, and the pickle in which they were immerſed, were made by Dr Beale, in May 1665; and had they been properly attended to and purſued, might have led to the diſcovery of the cauſe of this appearance. Having put ſome boiled mackerel into water, together with ſalt and ſweet herbs; when the cook was, ſome time after, ſtirring it, in order to take out ſome of the fiſhes, ſhe obſerved, that, at the firſt motion, the water was very luminous; and that the fiſh ſhining through the water added much to the light which the water yielded. The water was of itſelf thick and blackiſh, rather than of any other colour; and yet it ſhined on being ſtirred, and at the ſame time the fiſhes appeared more luminous than the water. Whenever the drops of this water, after it had been ſtirred, fell to the ground, they ſhined; and the children in the family diverted themſelves with taking the drops, which were as broad as a penny, and running with them about the houſe. The cook obſerved, that, when ſhe turned up that ſide of the fiſh that was loweſt, no light came from

Phil. Tranſ. vol. lix. p. 450.

Light.

[illegible] that, when the water had ſettled for ſome time, it did not ſhine at all. The day following, the water gave but little light, and only after a briſk agitation, though the fiſhes continued to ſhine as well from the inſide as the outſide, and eſpecially about the throat, and ſuch places as ſeemed to have been a little broken in the boiling.

When in the light of the ſun, he examined, with a microſcope, a ſmall piece of a fiſh which had ſhined very much the night before, he found nothing remarkable on its ſurface, except that he thought he perceived what he calls a *ſteam*, rather dark than luminous, ariſing like a very ſmall duſt from the fiſh, and here and there a very ſmall and almoſt imperceptible ſparkle. Of the ſparkles he had no doubt; but he thought it poſſible that the ſteam might be a deception of the ſight, or ſome duſt in the air.

Finding the fiſh to be quite dry, he moiſtened it with his ſpittle; and then obſerved that it gave a little light, though but for a ſhort time. The fiſh at that time was not fetid, nor yet inſipid to the beſt diſcerning palate. Two of the fiſhes he kept two or three days longer for farther trial: but, the weather being very hot, they became fetid: and, contrary to his expectations, there was no more light produced either by the agitation of the water or in the fiſh.

Father Bourzes's account of luminous ſea water.

Father Bourzes, in his voyage to the Indies in 1704, took particular notice of the luminous appearance of the ſea. The light was ſometimes ſo great, that he could eaſily read the title of a book by it, though he was nine or ten feet from the ſurface of the water. Sometimes he could eaſily diſtinguiſh, in the wake of a ſhip, the particles that were luminous from thoſe that were not; and they appeared not to be all of the ſame figure. Some of them were like points of light, and others ſuch as ſtars appear to the naked eye. Some of them were like globes, of a line or two in diameter; and others as big as one's head. Sometimes they formed themſelves into ſquares of three or four inches long, and one or two broad. Sometimes all theſe different figures were viſible at the ſame time; and ſometimes they were what he calls *vortices* of light, which at one particular time appeared and diſappeared immediately like flaſhes of lightning.

Nor did only the wake of the ſhip produce this light, but fiſhes alſo, in ſwimming, left ſo luminous a track behind them, that both their ſize and ſpecies might be diſtinguiſhed by it. When he took ſome of the water out of the ſea, and ſtirred it ever ſo little with his hand, in the dark, he always ſaw in it an infinite number of bright particles; and he had the ſame appearance whenever he dipped a piece of linen in the ſea, and wrung it in a dark place, even though it was half dry; and he obſerved, that when the ſparkles fell upon any thing that was ſolid, it would continue ſhining for ſome hours together.

His conjectures concerning the water.

After mentioning ſeveral circumſtances which did not contribute to this appearance, this father obſerves, that it depends very much upon the *quality of the water*; and he was pretty ſure that this light is the greateſt when the water is fatteſt, and fulleſt of foam. For in the main ſea, he ſays, the water is not everywhere equally pure; and that ſometimes, if linen be dipped in the ſea, it is clammy when it is drawn up again: and he often obſerved, that when the wake of the ſhip was the brighteſt, the water was the moſt fat and glutinous, and that linen moiſtened with it produced a great deal of light, if it was ſtirred or moved briſkly. Beſides, in ſome parts of the ſea, he ſaw a ſubſtance like ſaw duſt, ſometimes red and ſometimes yellow; and when he drew up the water in thoſe places, it was always viſcous and glutinous. The ſailors told him, that it was the ſpawn of whales; that there are great quantities of it in the north; and that ſometimes, in the night, they appeared all over of a bright light, without being put in motion by any veſſel or fiſh paſſing by them.

As a confirmation of this conjecture, that the more glutinous the ſea water is, the more it is diſpoſed to become luminous, he obſerves, that one day they took a fiſh which was called a *bonite*, the inſide of the mouth of which was ſo luminous, that, without any other light, he could read the ſame characters which he had before read by the light in the wake of the ſhip; and the mouth of this fiſh was full of a viſcous matter, which, when it was rubbed upon a piece of wood, made it immediately all over luminous; though, when the moiſture was dried up, the light was extinguiſhed.

Abbe Nollet's theory.

The abbé Nollet was much ſtruck with the luminouſneſs of the ſea when he was at Venice in 1749; and, after taking a great deal of pains to aſcertain the circumſtances of it, concluded that it was occaſioned by a ſhining inſect; and having examined the water very often, he at length did find a ſmall inſect, which he particularly deſcribes, and to which he attributes the light. The ſame hypotheſis had alſo occurred to M. Vianelli, profeſſor of medicine in Chioggia near Venice; and both he and M. Grizellini, a phyſician in Venice, have given drawings of the inſects from which they imagined this light to proceed.

The abbé was the more confirmed in his hypotheſis, by obſerving, ſome time after, the motion of ſome luminous particles in the ſea. For, going into the water, and keeping his head juſt above the ſurface, he ſaw them dart from the bottom, which was covered with weeds, to the top, in a manner which he thought very much reſembled the motions of inſects; though, when he endeavoured to catch them, he only found ſome luminous ſpots upon his handkerchief, which were enlarged when he preſſed them with his finger.

Obſervations of M. le Roi.

Memoires Preſentes, vol. iii. 144.

M. le Roi, making a voyage on the Mediterranean, preſently after the abbé Nollet made his obſervations at Venice, took notice, that in the day time, the prow of the ſhip in motion threw up many ſmall particles, which, falling upon the water, rolled upon the ſurface of the ſea for a few ſeconds before they mixed with it; and in the night the ſame particles, as he concluded, had the appearance of fire. Taking a quantity of the water, the ſame ſmall ſparks appeared whenever it was agitated; but, as was obſerved with reſpect to Dr Beale's experiments, every ſucceſſive agitation produced a leſs effect than the preceding, except after being ſuffered to reſt a while; for then a freſh agitation would make it almoſt as luminous as the firſt. This water, he obſerved, would retain its property of ſhining by agitation a day or two; but it diſappeared immediately on being ſet on the fire, though it was not made to boil.

This gentleman, after giving much attention to this phenomenon, concludes, that it is not occaſioned by

any

Light.

any ſhining inſects, as the abbé Nollet imagined; eſpecially as, after carefully examining ſome of the luminous points, which he caught upon an handkerchief, he found them to be round like large pins heads, but with nothing of the appearance of any animal, though he viewed them with a microſcope. He alſo found, that the mixture of a little ſpirit of wine with water juſt drawn from the ſea, would give the appearance of a great number of little ſparks, which would continue viſible longer than thoſe in the ocean. All the acids, and various other liquors, produced the ſame effect, though not quite ſo conſpicuouſly; but no freſh agitation would make them luminous again. M. le Roi is far from aſſerting that there are no luminous inſects in the ſea. He even ſuppoſes that the abbé Nollet and M. Vianelli had found them. But he was ſatisfied that the ſea is luminous chiefly on ſome other account, though he does not ſo much as advance a conjecture about what it is.

Experiments by M. Ant. Martin.

Swed. Abhand. vol. xxiii. p. 225.

M. Ant. Martin made many experiments on the light of fiſhes, with a view to diſcover the cauſe of the light of the ſea. He thought that he had reaſon to conclude, from a great variety of experiments, that all ſea fiſhes have this property; but that it is not to be found in any that are produced in freſh water. Nothing depended upon the colour of the fiſhes, except that he thought that the white ones, and eſpecially thoſe that had white ſcales, were a little more luminous than others. This light, he found, was increaſed by a ſmall quantity of ſalt; and alſo by a ſmall degree of warmth, though a greater degree extinguiſhed it. This agrees with another obſervation of his, that it depends entirely upon a kind of moiſture which they had about them, and which a ſmall degree of heat would expel, when an oilineſs remained which did not give this light, but would burn in the fire. Light from the fleſh of birds or beaſts is not ſo bright, he ſays, as that which proceeds from fiſh. Human bodies, he ſays, have ſometimes emitted light about the time that they began to putrefy, and the walls and roof of a place in which dead bodies had often been expoſed, had a kind of dew or clammineſs upon it, which was ſometimes luminous; and he imagined that the lights which are ſaid to be ſeen in burying-grounds may be owing to this cauſe.

By Mr Canton.

From ſome experiments made by Mr Canton, he concludes, that the luminouſneſs of ſea water is owing to the ſlimy and other putreſcent ſubſtances it contains. On the evening of the 14th of June 1768, he put a ſmall freſh whiting into a gallon of ſea water, in a pan which was about 14 inches in diameter, and took notice that neither the whiting nor the water, when agitated, gave any light. A Fahrenheit's thermometer, in the cellar where the pan was placed, ſtood at 54°. The 15th, at night, that part of the fiſh which was even with the ſurface of the water was luminous, but the water itſelf was dark. He drew the end of a ſtick through it, from one ſide of the pan to the other; and the water appeared luminous behind the ſtick all the way, but gave light only where it was diſturbed. When all the water was ſtirred, the whole became luminous, and appeared like milk, giving a conſiderable degree of light to the ſides of the pan; and it continued to do ſo for ſome time after it was at reſt. The water was moſt luminous when the fiſh had been in it [illegible]; but it never gave any light by being ſtirred, after it had been in it three days.

He then put a gallon of freſh water into one pan, and an equal quantity of ſea water into another; and into each pan he put a freſh herring of about three ounces. The next night the whole ſurface of the ſea water was luminous without being ſtirred; but it was much more ſo when it was put in motion; and the upper part of the herring, which was conſiderably below the ſurface of the water, was alſo very bright; while at the ſame time the freſh water, and the fiſh that was in it, were quite dark. There were ſeveral very bright luminous ſpots on different parts of the ſurface of the ſea water; and the whole, when viewed by the light of a candle, ſeemed covered with a greaſy ſcum. The third night, the light of the ſea water while at reſt, was very little, if at all leſs than before; but when ſtirred, its light was ſo great as to diſcover the time by a watch, and the fiſh in it appeared as a dark ſubſtance. After this, its light was evidently decreaſing, but was not quite gone before the 7th night. The freſh water and the fiſh in it were perfectly dark during the whole time. The thermometer was generally above 60°.

The preceding experiments were made with ſea water: but he now made uſe of other water, into which he put common or ſea ſalt, till he found, by an hydrometer, that it was of the ſame ſpecific gravity with the ſea water; and, at the ſame time, in another gallon of water, he diſſolved two pounds of ſalt; and into each of theſe waters he put a ſmall freſh herring. The next evening the whole ſurface of the artificial ſea water was luminous without being ſtirred; but gave much more light when it was diſturbed. It appeared exactly like the real ſea water in the preceding experiment; its light laſted about the ſame time, and went off in the ſame manner: while the other water, which was almoſt as ſalt as it could be made, never gave any light. The herring which was taken out of it the ſeventh night, and waſhed from its ſalt, was found firm and ſweet; but the other herring was very ſoft and putrid, much more ſo than that which had been kept as long in freſh water. If a herring, in warm weather, be put into 10 gallons of artificial ſea water, inſtead of one, the water, he ſays, will ſtill become luminous, but its light will not be ſo ſtrong.

It appeared by ſome of the firſt obſervations on this ſubject, that *heat* extinguiſhes the light of putreſcent ſubſtances. Mr Canton alſo attended to this circumſtance; and obſerves, that though the greateſt ſummer heat is well known to promote putrefaction, yet 20 degrees more than that of the human blood ſeems to hinder it. For putting a ſmall piece of a luminous fiſh into a thin glaſs ball, he found, that water of the heat of 118 degrees would extinguiſh its light in leſs than half a minute; but that, on taking it out of the water, it would begin to recover its light in about 10 ſeconds; but it was never afterwards ſo bright as before.

Mr Canton made the ſame obſervation that Mr Ant. Martin had done, viz. that ſeveral kinds of river fiſh could not be made to give light, in the ſame circumſtances in which any ſea fiſh became luminous. He ſays, however, that a piece of carp made the water very luminous, though the outſide, or ſcaly part of it, did not ſhine at all.

For the ſake of thoſe perſons who may chooſe to repeat his experiments, he obſerves, that artificial ſea water may be made without the uſe of an hydrometer, by the proportion of four ounces avoirdupois of ſalt to ſeven pints of water, wine meaſure.

A very elaborate paper on the ſubject by Dr Hulme appeared in the Philoſophical Tranſactions for 1800, to which we refer our readers, and to CHEMISTRY, p. 451.

The ocean luminous from inſects.

From undoubted obſervations, however, it appears, that in many places of the ocean it is covered with luminous inſects to a very conſiderable extent. M. Dagelet, a French aſtronomer who returned from the Terra Auſtralis in the year 1774, brought with him ſeveral kinds of worms which ſhine in water when it is ſet in motion; and M. Rigaud, in a paper inſerted (if we are not miſtaken) in the Journal des Sçavans for the month of March 1770, affirms, that the luminous ſurface of the ſea, from the port of Breſt to the Antilles, contains an immenſe quantity of little, round, ſhining polypuſes of about a quarter of a line in diameter. Other learned men, who acknowledge the exiſtence of theſe luminous animals, cannot, however, be perſuaded to conſider them as the cauſe of all that light and ſcintillation that appear on the ſurface of the ocean: they think that ſome ſubſtance of the phoſphorus kind, ariſing from putrefaction, muſt be admitted as one of the cauſes of this phenomenon. M. Godehoue has publiſhed curious obſervations on a kind of fiſh called in French *bonite*, already mentioned; and though he has obſerved, and accurately deſcribed, ſeveral of the luminous inſects that are found in ſea water, he is, nevertheleſs, of opinion, that the ſcintillation and flaming light of the ſea proceed from the oily and greaſy ſubſtances with which it is impregnated.

The abbé Nollet was long of opinion, that the light of the ſea proceeded from electricity (A); though he afterwards ſeemed inclined to think, that this phenomenon was cauſed by ſmall animals, either by their luminous aſpect, or at leaſt by ſome liquor or effluvia which they emitted. He did not, however, exclude other cauſes; among theſe, the ſpawn or fry of fiſh deſerves to be noticed. M. Dagelet, ſailing into the bay of Antongil, in the iſland of Madagaſcar, obſerved a prodigious quantity of fry which covered the ſurface of the ſea above a mile in length, and which he at firſt took for banks of ſand on account of their colour; they exhaled a diſagreeable odour, and the ſea had appeared with uncommon ſplendor ſome days before. The ſame accurate obſerver, perceiving the ſea remarkably luminous in the road of the Cape of Good Hope during a perfect calm, remarked, that the oars of the canoes produced a whitiſh and pearly kind of luſtre; when he took in his hand the water which contained this phoſphorus, he diſcerned in it, for ſome minutes, globules of light as large as the heads of pins. When he preſſed theſe globules, they appeared to his touch like a ſoft and thin pulp; and ſome days after the ſea was covered near the coaſts with whole banks of theſe little fiſh in innumerable multitudes.

Ignis fatuus.

To putrefaction, alſo, ſome are willing to attribute that luminous appearance which goes by the name of *ignis fatuus*, to which the credulous vulgar aſcribe very extraordinary and eſpecially miſchievous powers. It is moſt frequently obſerved in boggy places and near rivers, though ſometimes alſo in dry places. By its appearance benighted travellers are ſaid to have been ſometimes miſled into marſhy places, taking the light which they ſaw before them for a candle at a diſtance; from which ſeemingly miſchievous property it has been thought by the vulgar to be a ſpirit of a malignant nature, and been named accordingly *Will with a wiſp*, or *Jack with a lanthorn*; for the ſame reaſon alſo it probably had its Latin name *ignis fatuus*.

This kind of light is ſaid to be frequent about burying places and dunghills. Some countries are alſo remarkable for it, as about Bologna in Italy, and ſome parts of Spain and Ethiopia. Its forms are ſo uncertain and variable that they can ſcarce be deſcribed, eſpecially as few philoſophical obſervers ever had the good fortune to meet with it. Dr Derham, however, happened one night to perceive one of them, and got ſo near that he could have a very advantageous view of it. This is by no means eaſy to be obtained; for, among other ſingularities of the *ignis fatuus*, it is obſerved to avoid the approach of any perſon, and fly from place to place as if it was animated. That which Dr Derham obſerved was in ſome boggy ground betwixt two rocky hills; and the night was dark and calm; by which means, probably, he was enabled to advance within two or three yards of it. It appeared like a complete body of light without any diviſion, ſo that he was ſure it could not be occaſioned by inſects as ſome have ſuppoſed; the ſeparate lights of which he could not have failed to diſtinguiſh, had it been occaſioned by them. The light kept dancing about a dead thiſtle, till a very ſlight motion of the air, occaſioned, as he ſuppoſed, by his near approach to it, made it jump to another place; after which it kept flying before him as he advanced. M. Beccaria endeavoured to procure all the intelligence he could concerning this phenomenon, by inquiring of all his acquaintance who might have had an opportunity of obſerving it. Thus he obtained information that two of theſe lights appeared in the plains about Bologna, the one to the north, and the other to the ſouth, of that city, and were to be ſeen almoſt every dark night, eſpecially that to the eaſtward, giving a light equal to an ordinary faggot. The latter appeared to a gentleman of his acquaintance as he was travelling; moved conſtantly before him for about a mile; and gave a better light than a torch which was carried before him. Both theſe appearances gave a very ſtrong light, and were conſtantly in motion, though this various and uncertain. Sometimes they would riſe, ſometimes ſink; but commonly they would hover about ſix feet from the ground; they would alſo frequently diſappear on a ſudden,

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(A) This hypotheſis was alſo maintained in a treatiſe publiſhed at Venice in 1746, by an officer in the Auſtrian ſervice, under the title, *Dell' Eletreciſmo*.

den, and appear again in ſome other place. They differed alſo in ſize and figure, ſometimes ſpreading pretty wide, and then contracting themſelves; ſometimes breaking into two, and then joining again. Sometimes they would appear like waves, at others they would ſeem to drop ſparks of fire: they were but little affected by the wind; and in wet and rainy weather were frequently obſerved to caſt a ſtronger light than in dry weather: they were alſo obſerved more frequently when ſnow lay upon the ground, than in the hotteſt ſummer; but he was aſſured that there was not a dark night throughout the whole year in which they were not to be ſeen. The ground to the eaſtward of Bologna, where the largeſt of theſe appearances was obſerved, is a hard chalky ſoil mixed with clay, which will retain the moiſture for a long time, but breaks and cracks in hot weather. On the mountains, where the ſoil is of a looſer texture, and leſs capable of retaining moiſture, the *ignes fatui* were leſs.

From the beſt information which M. Beccaria was able to procure, he found that theſe lights were very frequent about rivers and brooks. He concludes his narrative with the following ſingular account: "An intelligent gentleman travelling in the evening, between eight and nine, in a mountainous road about ten miles ſouth of Bologna, perceived a light which ſhone very ſtrangely upon ſome ſtones which lay on the banks of the river Rioverde. It ſeemed to be about two feet above the ſtones, and not far from the water. In ſize and figure it had the appearance of a parallelopiped, ſomewhat more than a foot in length, and half a foot high, the longeſt ſide being parallel to the horizon. Its light was ſo ſtrong, that he could plainly diſcern by it part of a neighbouring hedge and the water of the river; only in the eaſt corner of it the light was rather faint, and the ſquare figure leſs perfect, as if it was cut off or darkened by the ſegment of a circle. On examining it a little nearer, he was ſurpriſed to find that it changed gradually from a bright red, firſt to a yellowiſh, and then to a pale colour, in proportion as he drew nearer; and when he came to the place itſelf, it quite vaniſhed. Upon this he ſtepped back, and not only ſaw it again, but found that the farther he went from it, the ſtronger and brighter it grew. When he examined the place of this luminous appearance, he could perceive no ſmell nor any other mark of fire." This account was confirmed by another gentleman, who informed M. Beccaria, that he had ſeen the ſame light five or ſix different times in ſpring and in autumn; and that it always appeared of the ſame ſhape, and in the very ſame place. One night in particular, he obſerved it come out of a neighbouring field to ſettle in the uſual place.

A very remarkable account of an *ignis fatuus* is given by Dr Shaw in his Travels to the Holy Land. It appeared in the valleys of Mount Ephraim, and attended him and his company for more than an hour. Sometimes it would appear globular, or in the ſhape of the flame of a candle; at others it would ſpread to ſuch a degree as to involve the whole company in a pale inoffenſive light, then contract itſelf, and ſuddenly diſappear; but in leſs than a minute would appear again; ſometimes running ſwiftly along, it would expand itſelf at certain intervals over more than two or three acres of the adjacent mountains. The atmoſphere from the beginning of the evening had been remarkably thick and hazy; and the dew, as they felt it on the bridles of their horſes, was very clammy and unctuous.

Lights reſembling the *ignis fatuus* are ſometimes obſerved at ſea, ſkipping about the maſts and rigging of ſhips; and Dr Shaw informs us, that he has ſeen theſe in ſuch weather as that juſt mentioned when he ſaw the *ignis fatuus* in Paleſtine. Similar appearances have been obſerved in various other ſituations; and we are told of one which appeared about the bed of a woman in Milan, ſurrounding it as well as her body entirely. This light fled from the hand which approached it; but was at length entirely diſperſed by the motion of the air. Of the ſame kind alſo, moſt probably, are thoſe ſmall luminous appearances which ſometimes appear in houſes or near them, called in Scotland *Elf candles*, and which are ſuppoſed to portend the death of ſome perſon about the houſe. In general theſe lights are harmleſs, though not always; for we have accounts of ſome luminous vapours which would encompaſs ſtacks of hay and corn, and ſet them on fire; ſo that they became objects of great terror and concern to the country people. Of theſe it was obſerved, that they would avoid a drawn ſword, or ſharp-pointed iron inſtrument, and that they would be driven away by a great noiſe; both which methods were made uſe of to diſſipate them: and it was likewiſe obſerved, that they came from ſome diſtance, as it were on purpoſe to do miſchief.

Several philoſophers have endeavoured to account for theſe appearances, but hitherto with no great ſucceſs; nor indeed does there ſeem to be ſufficient data for ſolving all their phenomena. Willoughby, Ray, and others, have imagined that the light was occaſioned by a number of ſhining inſects; but this opinion was never ſupported in ſuch a manner as to gain much ground. The *ignis fatuus* ſeen by Dr Derham above mentioned, as well as all the other inſtances we have related ſeem to demonſtrate the contrary. Sir Iſaac Newton calls it a vapour ſhining without heat; and ſuppoſes that there is the ſame difference between the vapour of *ignis fatuus* and flame, that there is between the ſhining or rotten wood and burning coals. But though this ſeems generally to be the caſe, there are ſtill ſome exceptions, as has been inſtanced in the vapours which ſet fire to the ſtacks of corn. Dr Prieſtley ſuppoſes that the light is of the ſame nature with that produced by putreſcent ſubſtances; and others are of opinion, that the electrical fluid is principally concerned; but none have attempted to give any particular ſolution of the phenomena.

From the frequent appearance of the *ignis fatuus* in marſhes, moiſt ground, burying places, and dunghills, we are naturally led to conclude, that putrefaction is concerned in the production of it. This proceſs, we know, is attended with the emiſſion of an aqueous ſteam, together with a quantity of fixed, inflammable, and azotic airs, all blended together in the form of vapour. It is likewiſe attended with ſome degree of heat; and we know that there are ſome vapours, that of ſulphur particularly, which become luminous, with a degree of heat much leſs than that ſufficient to ſet fire to combuſtible bodies. There is no inconſiſtency, therefore, in ſuppoſing that the putrid vapour may be capable of ſhining with a ſtill ſmaller degree of heat than that of ſulphur, and conſequently become luminous by that which putrefaction alone affords. This would account for the *ignis fatuus*, were it only a ſteady luminous vapour ariſing from places where putrid matters are contained; but its extreme mobility, and flying from one place to another on the approach of any perſon, cannot be accounted for on this principle. If one quantity of the putrid vapour becomes luminous by means of heat, all the reſt ought to do ſo likewiſe; ſo that, though we may allow heat and putrefaction to be concerned, yet of neceſſity we muſt have recourſe to ſome other agent, which cannot be any other than electricity. Without this, it is impoſſible to conceive how any body of moveable vapour ſhould not be carried away by the wind; but ſo far is this from being the caſe, that the *ignes fatui*, deſcribed by M. Beccaria, were but little affected by the wind. It is beſides proved by undoubted experiment, that electricity always is attended with ſome degree of heat; and this, however ſmall, may be ſufficient to give a luminous property to any vapour on which it acts ſtrongly; not to mention, that the electric fluid itſelf is no other than that of light, and may therefore by its action eaſily produce a luminous appearance independent of any vapour.

We have a ſtrong proof that electricity is concerned, or indeed the principal agent, in producing the *ignis fatuus*, from an experiment related by Dr Prieſtley of a flame of this kind being artificially produced. A gentleman, who had been making many electrical experiments for a whole afternoon in a ſmall room, on going out of it, obſerved a flame following him at ſome little diſtance. This, we have no reaſon to doubt, was a true *ignis fatuus*, and the circumſtances neceſſary to produce it were then preſent, viz. an atmoſphere impregnated with animal vapour, and likewiſe ſtrongly electrified. Both theſe circumſtances undoubtedly muſt have taken place in the preſent caſe; for the quantity of perſpiration emitted by a human body is by no means inconſiderable; and it, as well as the electricity, would be collected by reaſon of the ſmallneſs of the room. In this caſe, however, there ſeems to have been a conſiderable difference between the artificial *ignis fatuus* and thoſe commonly met with; for this flame *followed* the gentleman as he went out of the room; but the natural ones commonly fly from thoſe who approach them. This may be accounted for, from a difference between the electricity of the atmoſphere in the one room and the other; in which caſe the flame would naturally be attracted towards that place where the electricity was either different in quality or in quantity; but in the natural way, where all bodies may be ſuppoſed equally electrified for a great way round, a repulſion will as naturally take place. Still, however, this does not ſeem to be always the caſe. In thoſe inſtances where travellers have been attended by an *ignis fatuus*, we cannot ſuppoſe it to have been influenced by any other power than what we call *attraction*, and which electricity is very capable of producing. Its keeping at ſome diſtance is likewiſe eaſily accounted for; as we know that bodies poſſeſſed of different quantities of electricity may be made to attract one another for a certain ſpace, and then repel without having ever come into contact. On this principle we may account for the light which ſurrounded the woman at Milan, but fled from the hand of any other perſon. On the ſame principle may we account for theſe miſchievous vapours which ſet fire to the hay and corn ſtacks, but were driven away by preſenting to them a pointed iron inſtrument, or by making a noiſe. Both theſe are known to have a great effect upon the electric matter; and by means of either, even lightning may occaſionally be made to fall upon or to avoid particular places, according to the circumſtances by which the general maſs happens to be affected at that time.

Light.

On the whole, therefore, it ſeems moſt probable, that the *ignis fatuus* is a collection of vapour of the putreſcent kind, very much affected by electricity; according to the degree of which, it will either give a weak or ſtrong light, or even ſet fire to certain ſubſtances diſpoſed to receive its operation. This opinion ſeems greatly to be confirmed from ſome luminous appearances obſerved in privies, where the putrid vapours have even collected themſelves into balls, and exploded violently on the approach of a candle. This laſt effect, however, we cannot ſo well aſcribe to the electricity, as to the accenſion of the inflammable air which frequently abounds in ſuch places.

In the appendix to Dr Prieſtley's third volume of Experiments and Obſervations on Air, Mr Warltire gives an account of ſome very remarkable *ignes fatui*, which he obſerved on the road to Bromſgrove, about five miles from Birmingham. The time of obſervation was the 12th of December 1776, before day-light. A great many of theſe lights were playing in an adjacent field, in different directions; from ſome of which there ſuddenly ſprung up bright branches of light, ſomething reſembling the exploſion of a rocket that contained many brilliant ſtars, if the diſcharge was upwards, inſtead of the uſual direction; and the hedge and trees on each ſide of the hedge were illuminated. This appearance continued but a few ſeconds, and then the jack-a-lanterns played as before. Mr Warltire was not near enough to obſerve if the apparent exploſions were attended with any report.

Cronſtedt gives it as his opinion, that *ignis fatuus*, as well as the meteors called *falling ſtars*, are owing to collections of inflammable air raiſed to a great height in the atmoſphere. But, with regard to the latter, the vaſt height at which they move evidently ſhows that they cannot be the effect of any *gravitating* vapour whatever; for the lighteſt inflammable air is one-twelfth of that of the common atmoſphere: and we have no reaſon to believe, that at the diſtance of 40 or 50 miles from the earth, the latter has near one-twelfth of its weight at the ſurface. From the account given by Mr Warltire, we ſhould be apt to conclude, that there is a ſtrong affinity betwixt the *ignes fatui* and fire balls, inſomuch that the one might be very eaſily converted into the other. From this then we muſt aſcribe an electrical origin to the one as well as the other. Electricity, we know, can aſſume both theſe appearances, as is evident in the caſe of points: or even when the atmoſphere is violently electrified, as around the ſtring of an electrical kite, which always will appear to be ſurrounded with a blue flame in the night, if the electricity be very ſtrong.

On the whole, it appears, that electricity acting upon a ſmall quantity of atmoſpherical air, with a certain degree of vigour, will produce an appearance reſembling an *ignis fatuus;* with a ſuperior force it will produce a fire ball; and a ſudden increaſe of electrical power might produce thoſe ſparks and apparent exploſions obſerved by Mr Warltire. The only difficulty therefore is, Why does electricity exert its power upon one portion of the atmoſphere rather than another, ſeeing it has an opportunity of diffuſing itſelf equally through the whole? To this it ſeems impoſſible to give any other reaſon than that we ſee the fact is ſo; and that in all caſes where there is a quantity of electrified air or vapour, there will be an accumulation in one part rather than another. Thus, in the experiment already related, where the gentleman perceived a blue flame following him, the whole air of the room was electrified, but the greateſt power of the fluid was exerted on that which gave the luminous appearance.

With regard to the uſes of the *ignes fatui* in the ſyſtem of nature, we can only ſay, that they ſeem to be accidental appearances reſulting from the motion of the electric fluid, and, no doubt, like other meteors ſubſervient to the preſervation of its equilibrium, and thus are uſeful in preventing thoſe dreadful commotions which enſue when a proper medium for ſo doing is deficient.

Phoſphoric light.

A light in ſome reſpects ſimilar to thoſe above mentioned has been found to proceed from that celebrated chemical production called *phoſphorus*, which always tends to decompoſe itſelf, ſo as to take fire by the acceſs of *air* only. Phoſphorus, therefore, when it emits light, is properly a body ignited; though when a very ſmall quantity of it is uſed, as what is left after drawing it over paper, or what may be diſſolved in eſſential oil, the heat is not ſenſible. But perhaps the matter which emits the light in what we call *putreſcent ſubſtances* may be ſimilar to it, though it be generated by a different proceſs, and burn with a leſs degree of heat. Putreſcence does not ſeem to be neceſſary to the light of glow-worms or of the pholades; and yet their light is ſufficiently ſimilar to that of ſhining wood or fleſh. Electric light is unqueſtionably ſimilar to that of phoſphorus, though the ſource of it is apparently very different.

Kunckel formed his phoſphorus into a kind of pills about the ſize of peas, which being moiſtened a little, and ſcraped in the dark, yielded a very conſiderable light, but not without ſmoke. The light was much more pleaſing when eight or ten of theſe pills were put into a glaſs of water; for being ſhaken in the dark, the whole glaſs ſeemed to be filled with light. Kunckel alſo reduced his phoſphorus into the form of larger ſtones; which being warmed by a perſon's hand, and rubbed upon paper, would deſcribe letters that were very legible in the dark.

The greateſt variety of experiments with the light of phoſphorus was made by Dr Slare; who ſays, that the liquid phoſphorus (which is nothing more than the ſolid phoſphorus diſſolved in any of the eſſential oils) would not hurt even a lady's hand; or that, when the hands or face were waſhed with it, it would not only make them viſible to other perſons in the dark, but that the light was ſo conſiderable as to make other neighbouring objects viſible.

When the ſolid phoſphorus is quite immerſed in water, he obſerves that it ceaſes to ſhine; but that if any part of it chance to emerge, or get into the air, it will ſhine though the glaſs be hermetically ſealed. In a large glaſs he kept it without water for ſeveral days; and yet it continued ſhining, with very little diminution of its light or weight. If the letters that were written with this phoſphorus were warmed by the fire, they preſently became dark lines, which continued upon the paper, like ink. To try how much light was given by a ſmall quantity of this phoſphorus, he obſerved that it continued to flame in the open air for ſeven or eight days; the light being viſible whenever he ſhut his window.

As air was generally thought to contain the *pabulum* of flame, Dr Slare was determined to try this with reſpect to phoſphorus; and for this purpoſe he placed a large piece of it in a receiver; but upon exhauſting it, he perceived that it became more luminous, and that, upon admitting the air, it returned to its former ſtate. This property of the light of phoſphorus, which is the very reverſe of that of ſhining wood and fiſhes, was alſo aſcertained by ſeveral very accurate experiments of Mr Haukſbee's.

Endeavouring to blow the phoſphorus into a flame with a pair of bellows, Dr Slare found that it was preſently blown out, and that it was a conſiderable time before the light revived again. All liquors would extinguiſh this light when the phoſphorus was put into them; nor would it ſhine or burn, though it was even boiled in the moſt inflammable liquors, as oil of olives, ſpirit of turpentine, or even ſpirit of wine.

In order to keep his phoſphorus from conſuming, he uſed to put it in a glaſs of water; and ſometimes he has ſeen it, when thus immerſed in water, make ſuch bright and vigorous coruſcations in the air, as, he ſays, would ſurpriſe and frighten thoſe who are not uſed to the phenomenon. This fiery meteor, he ſays, is contracted in its paſſage through the water, but expands as ſoon as it gets above it. If any perſon would make this experiment to advantage, he informs them that the glaſs muſt be deep and cylindrical, and not above three quarters filled with water. This effect he perceived in warm weather only, and never in cold.

The phoſphorus of which we have been treating is prepared from urine; but in ſome caſes the ſweat, which is ſimilar to urine, has been obſerved to be phoſphoraceous, without any preparation. This once happened to a perſon who uſed to eat great quantities of ſalt, and who was a little ſubject to the gout, after ſweating with violent exerciſe. Stripping himſelf in the dark, his ſhirt ſeemed to be all on fire, which ſurpriſed him very much. Upon examination, red ſpots were found upon his ſhirt; and the phyſician who was preſent perceived an urinous ſmell, though it had nothing in it of volatile alkali, but of the muriatic acid: the ſame, he ſays, that iſſues from cabbage much ſalted, and ſtrongly fermented.

Acta Cæſarienſa, vol. v. p. 334.

All theſe lights accounted for from electricity.

The eaſieſt method of accounting for all theſe kinds of lights, perhaps, is from electricity. If light conſiſts in a certain vibration of the electric fluid *, then it follows, that in whatever ſubſtances ſuch a vibration takes place, there light muſt appear, whether in putreſcent animal ſubſtances, ſea water, phoſphorus, or any thing elſe. We know that the electric matter pervades all

* See Electricity.

tenueſt in its ſubſtance, and is very liable to be ſet in motion from cauſes of which we are ignorant. The action of the air by which putrefaction is produced may be one of theſe cauſes; and it can by no means appear ſurpriſing that the electric matter ſhould act in the bodies of living animals in ſuch a manner as to produce a permanent light, when we certainly know it acts in ſome of them ſo powerfully as to produce a ſhock ſimilar to that of a charged phial.——On this ſubject we ſhall only obſerve farther, that when this vibration becomes ſo powerful as to penetrate the ſolid ſubſtance of the body itſelf, the luminous body then becomes tranſparent, as in the milk mentioned in the former part of this article; but when it is only ſuperficial, the body, though it emits light, is itſelf opaque.

Light from Diamonds. Among luminous bodies the diamond is to be reckoned; as ſome diamonds are known to ſhine in the dark. But on account of the feebleneſs of their ſplendour, it is neceſſary for the perſon who is to obſerve them, previouſly to ſtay in the dark at leaſt a quarter of an hour; that the pupil of the eye may be dilated and enlarged, and ſo rendered capable of receiving a large quantity of the rays of light. M. du Fay has alſo obſerved, that the eyes ought to be ſhut for this time, or at leaſt one of them; and that, in that caſe, the light of the diamond is afterwards only ſeen by that eye which has been ſhut. Before the diamond is brought into the dark room, it muſt be expoſed to the ſunſhine, or at leaſt to the open daylight, to imbibe a ſufficient quantity of rays: and this is done in one minute, or even leſs; eight or ten ſeconds having been found to furniſh as much light as a ſtone is capable of receiving: and when brought into the dark, its light continues about twelve or thirteen minutes, weakening all the while by inſenſible degrees. It is very remarkable, that in bodies ſo extremely ſimilar to each other as diamonds are, ſome ſhould have this property of imbibing the ſun's rays, and ſhining in the dark, and that others ſhould not; yet ſo it is found to be by experiment, and the moſt nearly reſembling ſtones ſhall be found one to have this property, and another to be deſtitute of it; while many of the moſt diſſimilar have the property in common. There ſeems to be no rule, nor even the leaſt traces of any imperfect rule of judging, which diamonds have, and which have not this property; their natural brightneſs, their purity, their ſize, or their ſhape, contribute nothing to it: and all that has been yet diſcovered of the leaſt regularity among them, is, that all yellow diamonds have this property. This is ſuppoſed to ariſe from their having more ſulphur in their compoſition, and therefore illuminating more readily, or emitting a more viſible flame.

The burning of diamonds is a term uſed among the jewellers, for putting them into a fierce fire, as they frequently do, when they are fouled with brown, or yellow, or the like; this always diveſts them of their colour, without doing them the leaſt ſenſible injury. M. du Fay, having been informed of this common practice, formed a conjecture, that the difference of diamonds in their ſhining or not ſhining in the dark, was owing to it; and that either all thoſe which had been burnt, or all thoſe which had not, were thoſe which alone ſhone in the dark. But this was found an erroneous conjecture: for two diamonds, one lucid in the dark, the other not, were both burnt, and afterwards both were found to retain the ſame properties they had before. It is not only the open ſunſhine, or open daylight, which gives to theſe diamonds the power of ſhining in the dark; they receive it in the ſame manner even if laid under a glaſs, or plunged in water or in milk.

M. du Fay tried whether it was poſſible to make the diamond retain, for any longer time, the light it naturally parts with ſo ſoon: and found, that if the diamond, after being expoſed to the light, be covered with black wax, it will ſhine in the dark, as well ſix hours afterwards as at the time it was firſt impregnated with the light.

The imbibing light, in this manner, being ſo nice a property as not to be found in ſeveral diamonds, it was not to be ſuppoſed that it would be found in any other ſtones: accordingly, on trial, the ruby, the ſapphire, and the topaz, were found wholly deſtitute of it; and among a large number of rough emeralds, one only was found to poſſeſs it. Such is the ſtrange uncertainty of theſe accidents.

All the other leſs precious ſtones were tried, and found not to poſſeſs this property of imbibing light from the daylight or ſunſhine, but they all became luminous by the different means of heating or friction: with this difference, that ſome acquired it by one of theſe methods, and others by the other; each being unaffected by that which gave the property to the other. The diamond becomes luminous by all theſe ways.

Beccarius alſo diſcovered, that diamonds have the property of the Bolognian phoſphorus, about the ſame time that it occurred to M. du Fay. *Com. Bonon.* vol. ii. p. 276. M. du Fay likewiſe obſerved, that the common topaz, when calcined, had all the properties of this phoſphorus; and purſuing the diſcovery, he found the ſame property, in a great degree, in the belemnites, gypſum, limeſtone, and marble: though he was obliged to diſſolve ſome very hard ſubſtances of this kind in acids, before calcination could produce this change in them; and with ſome ſubſtances he could not ſucceed even thus; eſpecially with flint ſtones, river ſand, jaſpers, agates, and rock cryſtal.

Light from Plants. In Sweden a very curious phenomenon has been obſerved on certain flowers by M. Haggern, lecturer in natural hiſtory. One evening he perceived a faint flaſh of light repeatedly dart from a marigold. Surpriſed at ſuch an uncommon appearance, he reſolved to examine it with attention; and, to be aſſured it was no deception of the eye, he placed a man near him, with orders to make a ſignal at the moment when he obſerved the light. They both ſaw it conſtantly at the ſame moment.

The light was moſt brilliant on marigolds of an orange or flame colour; but ſcarcely viſible on pale ones.

The flaſh was frequently ſeen on the ſame flower two or three times in quick ſucceſſion, but more commonly at intervals of ſeveral minutes: and when ſeveral flowers in the ſame place emitted their light together, it could be obſerved at a conſiderable diſtance.

This phenomenon was remarked in the months of July and Auguſt at ſunſet, and for half an hour, when the atmoſphere was clear; but after a rainy day, or

Light. Light-Houſe.

when the air was loaded with vapours, nothing of it was ſeen.

The following flowers emitted flaſhes, more or leſs vivid, in this order:

1. The marigold, *calendula officinalis.*
2. Monk's-hood, *tropæolum majus.*
3. The orange lily, *lilium bulbiferum.*
4. The Indian pink, *tagetes patula et erecta.*

To diſcover whether ſome little inſects or phoſphoric worms might not be the cauſe of it, the flowers were carefully examined, even with a microſcope, without any ſuch thing being found.

From the rapidity of the flaſh, and other circumſtances, it may be conjectured that there is ſomething of electricity in this phenomenon. It is well known, that when the piſtil of a flower is impregnated, the pollen burſts away by its elaſticity, with which electricity may be combined. But M. Haggern, after having obſerved the flaſh from the orange lily, the antheræ of which are a conſiderable ſpace diſtant from the petals, found that the light proceeded from the petals only; whence he concludes, that this electric light is cauſed by the pollen, which, in flying off, is ſcattered on the petals. Whatever be the cauſe, the effect is ſingular and highly curious.

Lights, in *Painting*, are thoſe parts of a piece which are illuminated, or that lie open to the luminary by which the piece is ſuppoſed to be enlightened; and which, for this reaſon, are painted in bright vivid colours.

In this ſenſe, light is oppoſed to ſhadow.

Different lights have very different effects on a picture, and occaſion a difference in the management of every part. A great deal therefore depends on the painter's chooſing a proper light for his piece to be illuminated by; and a great deal more, in the conduct of the lights and ſhadows, when the luminary is pitched upon.

The ſtrength and relievo of a figure, as well as its gracefulneſs, depend entirely on the management of the lights, and the joining of thoſe to the ſhadows.

The light a figure receives is either direct or reflected; to each of which ſpecial regard muſt be had. The doctrine of lights and ſhadows makes that part of painting called *clair-obſcure.*

Light-Horſe, an ancient term in our Engliſh cuſtoms, ſignifying an ordinary cavalier or horſeman lightly armed, and ſo as to enter a corps or regiment; in oppoſition to the men at arms, who were heavily accoutred, and armed at all points. See *Light-Horse.*

Light-Houſe, a building erected upon a cape or promontory on the ſea-coaſt, or upon ſome rock in the ſea, and having on its top in the night-time a great fire, or light made by candles, which is conſtantly attended by ſome careful perſon, ſo as to be ſeen at a great diſtance from the land. It is uſed to direct the ſhipping on the coaſt, that might otherwiſe run aſhore, or ſteer an improper courſe, when the darkneſs of the night and the uncertainty of currents, &c. might render their ſituation with regard to the ſhore extremely doubtful. Lamp-lights are, on many accounts, preferable to coal fires or candles; and the effect of theſe may be very much increaſed by placing them either behind glaſs lenſes, or before properly diſpoſed glaſs or metal reflectors, which laſt method is now very generally adopted. See Beacons.

Light-Room Lightfoot.

Light-Room, a ſmall apartment, encloſed with glaſs windows, near the magazine of a ſhip of war. It is uſed to contain the lights by which the gunner and his aſſiſtants are enabled to fill cartridges with powder to be ready for action.

LIGHTER, a large, open, flat-bottomed veſſel, generally managed with oars, and employed to carry goods to or from a ſhip when ſhe is to be laden or delivered.—There are alſo ſome lighters furniſhed with a deck throughout their whole length, in order to contain thoſe merchandiſes which would be damaged by rainy weather: theſe are uſually called *cloſe lighters.*

LIGHTFOOT, John, a moſt learned Engliſh divine, was the ſon of a divine, and born in March 1602, at Stoke upon Trent in Staffordſhire. After having finiſhed his ſtudies at a ſchool on Morton-green near Congleton in Cheſhire, he was removed in 1617 to Cambridge, where he applied himſelf to eloquence, and ſucceeded ſo well in it as to be thought the beſt orator of the under graduates in the univerſity. He alſo made an extraordinary proficiency in the Latin and Greek; but neglected the Hebrew, and even loſt that knowledge he brought of it from ſchool. His taſte for the oriental languages was not yet excited; and as for logic, the ſtudy of it as managed at that time among the academics, was too quarrelſome and fierce for his quiet and meek diſpoſition. As ſoon as he had taken the degree of B. A. he left the univerſity, and became aſſiſtant to a ſchool at Repton in Derbyſhire. After he had ſupplied this place a year or two, he entered into orders, and became curate of Norton under Hales in Shropſhire. This curacy gave an occaſion of awakening his genius for the Hebrew tongue. Norton lies near Bellaport, then the ſeat of Sir Rowland Cotton; who was his conſtant hearer, made him his chaplain, and took him into his houſe. This gentleman being a perfect maſter of the Hebrew language, engaged Lightfoot in that ſtudy; who, by converſing with his patron, ſoon became ſenſible that without that knowledge it was impoſſible to attain an accurate underſtanding of the ſcriptures. He therefore applied himſelf to it with extraordinary vigour, and in a little time made a great progreſs in it: and his patron removing with his family to reſide in London, at the requeſt of Sir Alland Cotton his uncle, who was lord-mayor of that city, he followed his preceptor thither. But he did not ſtay long there: for, having a mind to improve himſelf by travelling abroad, he went down into Staffordſhire to take leave of his father and mother. Paſſing through Stone in that county, he found the place deſtitute of a miniſter: and the preſſing inſtances of the pariſhioners prevailed upon him to undertake that cure. Hereupon, laying aſide his deſign of travelling abroad, he began to turn his thoughts to ſettling at home. During his reſidence at Bellaport, he had fallen into the acquaintance of a gentlewoman who was daughter of William Crompton of Stonepark, Eſq. and now, being in poſſeſſion of a cure, he married her in 1628. But notwithſtanding this ſettlement, his eager thirſt after rabbinical learning would not ſuffer him to continue there. Sion-college library at London, he knew, was well ſtocked with books of that kind. He therefore quitted his charge at Stone, and removed with his family to Hornſey, near the city: where he gave the public a notable ſpecimen of his advancement in thoſe ſtudies, by his "Erubhim, or Miſcellanies Chriſtian and Judaical," in 1629. He was at this time only 27 years of age; and appears to have been well acquainted with the Latin and the Greek fathers, as well as the ancient heathen writers. Theſe firſt fruits of his ſtudies were dedicated to Sir Rowland Cotton; who, in 1631, preſented him to the rectory of Aſhley in Staffordſhire.

He ſeemed now to be fixed for life: Accordingly, he built a ſtudy in the garden, to be out of the noiſe of the houſe; and applied himſelf with indefatigable diligence in ſearching the ſcriptures. Thus employed, the days paſſed very agreeably; and he continued quiet and unmoleſted, till the great change which happened in the public affairs brought him into a ſhare of the adminiſtration relating to the church; for he was nominated a member of the memorable aſſembly of divines for ſettling a new form of eccleſiaſtical polity. This appointment was purely the effect of his diſtinguiſhed merit; and he accepted it purely with a view to ſerve his country, as far as lay in his power. The non-reſidence, which this would neceſſarily occaſion, apparently induced him to reſign his rectory: and having obtained the preſentation for a younger brother, he ſet out for London in 1642. He had now ſatisfied himſelf in clearing up many of the abſtruſeſt paſſages in the Bible, and therein had provided the chief materials, as well as formed the plan, of his "Harmony;" and an opportunity of inſpecting it at the preſs was, no doubt, an additional motive for his going to the capital: where he had not been long before he was choſen miniſter of St Bartholomew's, behind the Royal Exchange. The aſſembly of divines meeting in 1643, our author gave his attendance diligently there, and made a diſtinguiſhed figure in their debates; where he uſed great freedom, and gave ſignal proofs of his courage as well as learning, in oppoſing many of thoſe tenets which the divines were endeavouring to eſtabliſh. His learning recommended him to the parliament, whoſe viſitors, having ejected Dr William Spurſtow from the maſterſhip of Catharine-hall in Cambridge, put Lightfoot in his room, this year 1653; and he was alſo preſented to the living of Much-Munden in Hertfordſhire, void by the death of Dr Samuel Ward, Margaret-profeſſor of divinity in that univerſity, before the expiration of this year. Meanwhile he had his turn with other favourites in preaching before the houſe of commons, moſt of which ſermons were printed; and in them we ſee him warmly preſſing the ſpeedy ſettlement of the church in the Preſbyterian form, which he cordially believed to be according to the pattern in the Mount. He was all the while employed in preparing and publiſhing the ſeveral branches of his Harmony; all which were ſo many excellent ſpecimens of the uſefulneſs of human learning to true religion: and he met with great difficulties and diſcouragements in that work, chiefly from that antieruditional ſpirit which prevailed, and even threatened the deſtruction of the univerſities. In 1655 he entered upon the office of vice-chancellor of Cambridge, to which he was choſen that year, having taken the degree of doctor of divinity in 1652. He performed all the regular exerciſes for his degree with great applauſe, and executed the vice-chancellor's office with exemplary diligence and fidelity; and, particularly at the commencement, ſupplied the place of profeſſor of divinity, then undiſpoſed of, as an act which was kept for a doctor's degree in that profeſſion. At the ſame time he was engaged with others in perfecting the Polyglott Bible, then in the preſs. At the Reſtoration he offered to reſign the maſterſhip of Catharine-hall: But, as what he had done had been rather in compliance with the neceſſity of the times than from any zeal or ſpirit of oppoſition to the king and government, a confirmation was granted him from the crown, both of the place and of his living. Soon after this he was appointed one of the aſſiſtants at the conference upon the liturgy, which was held in the beginning of 1661, but attended only once or twice; probably diſguſted at the heat with which that conference was managed. However, he ſtuck cloſe to his deſign of perfecting his Harmony: and being of a ſtrong and healthy conſtitution, which was aſſiſted by an exact temperance, he proſecuted his ſtudies with unabated vigour to the laſt, and continued to publiſh, notwithſtanding the many difficulties he met with from the expence of it. However, not long before he died, ſome bookſellers got a promiſe from him to collect and methodiſe his works, in order to print them; but the execution was prevented by his death, which happened Dec. 6. 1675. The doctor was twice married: his firſt wife, already mentioned, brought him four ſons and two daughters. His ſecond wife was likewiſe a widow, and relict of Mr Auſtin Brograve, uncle of Sir Thomas Brograve, Bart of Hertfordſhire, a gentleman well verſed in rabbinical learning, and a particular acquaintance of our author. He had no iſſue by her. She alſo died before him, and was buried in Munden church; where the doctor was himſelf likewiſe interred near both his wives. Dr Lightfoot's works were collected and publiſhed firſt in 1684, in two volumes folio. The ſecond edition was printed at Amſterdam, 1686, in two volumes folio, containing all his Latin writings, with a Latin tranſlation of thoſe which he wrote in Engliſh. At the end of both theſe editions there is a liſt of ſuch pieces as he left unfiniſhed. It is the chief of theſe, in Latin, which make up the third volume, added to the former two, in a third edition of his works, by John Leuſden, at Utrecht, in 1699, folio. They were communicated by Mr Strype, who, in 1700, publiſhed anorher collection of theſe papers, under the title of "Some genuine remains of the late pious and learned Dr John Lightfoot."

LIGHTING of Streets. This invention, which is generally conſidered as of modern date, contributes greatly to the convenience and ſafety of the inhabitants of large cities, as well as to the ornament of their ſtreets. It is not probable that the ſtreets of ancient Rome were lighted, ſince the Romans conſidered the uſe of flambeaux and lanterns to be ſo neceſſary in returning home from their nocturnal viſits. It appears that ſuch as walked the ſtreets without theſe went home in darkneſs; and the return of Gito in the night-time, of which Petronius makes mention, clearly proves that the ſtreets of Naples were not lighted. Such as have aſcribed a remote antiquity to the lighting of ſtreets, ſeem to have miſtaken it for what are called illuminations, which indeed are of great antiquity. Egyptians, Jews, Greeks, and Romans, during the celebration of memorable feſtivals, were in the habit of illuminating their houſes; but this is entirely different from the practice which we are now conſidering.

Paris was probably the firſt city in modern times, the ſtreets of which were lighted, about the beginning of the 16th century, as they were very much infeſted by robbers and incendiaries. This occaſioned an edict, iſſued in 1524, commanding the inhabitants, whoſe windows fronted the ſtreet, to keep lights burning after nine o'clock at night. In 1558, *falots* were placed at the corners of the ſtreets; but when theſe were too long to receive benefit from the light of one, three were erected in different parts of it. The city of Paris had then 912 ſtreets, and the number of lights rather under 2736; but in the ſame year theſe were changed for lanterns, of a ſimilar conſtruction with thoſe uſed at preſent.

In 1671, the lanterns were ordered to be lighted every year from the 20th October to the end of March the enſuing year. Some time after this a premium was offered for a diſſertation on the beſt means of improving the lighting of the ſtreets, when a journeyman glazier obtained a premium of 200 livres, and Meſſrs Bailly, le Roy, and Bourgeois de Chateaublanc, 2000 livres. The lamps of Paris amounted to 5772 in the year 1721, and in 1771, to 6232. The city of Nantz was lighted in 1777, and had no fewer than 500 lamps in the year 1780.

The inhabitants of the city of London were ordered, in 1688, to hang out lanterns duly at the accuſtomed time, which was renewed in 1690; and in 1716 it was enacted, that all thoſe whoſe houſes fronted any ſtreet, lane, or public paſſage, ſhould hang out one or more lights, which were to burn from 6 o'clock to 11. But as the time of lighting them was reſtricted to 117 nights in the year, on which account many depredations were eaſily committed by thieves and robbers, the lord mayor and council applied for, and obtained an act of parliament, empowering them to light the ſtreets in a better manner. In conſequence of this act, the lamps were increaſed from 1000 to 4769, and afterwards to 5000. But as theſe were confined to the city and liberties, about one-fifth of the whole of London, the number of lamps could not be leſs than 15,000. The continuance of their burning was alſo increaſed from 750 to 5000 hours. In 1744, another act was obtained to regulate ſtill farther the lighting of the city, and it was placed on the footing on which it ſtands at preſent. Theſe are now ſo numerous, that Oxford ſtreet alone is ſaid to contain more lamps than the whole city of Paris. Birmingham was lighted for the firſt time in 1733, with 700 lamps.

In 1669, Amſterdam was lighted by lanterns; the Hague in 1553 was lighted in a particular manner, but lamps were not fixed up in all the ſtreets till the year 1678. The ſtreets of Copenhagen were lighted in 1681, the plan of which was much improved in 1683. Berlin at preſent has 2354 lamps, kept lighted from September to May at the expence of the ſovereign. Vienna began to be lighted in 1687, and lamps were introduced in 1704. In 1776 their number amounted to 2000, which was increaſed to 3000, to be lighted at the annual expence of 30,000 florins. Leipzig was lighted in 1702, Dreſden in 1705, Caſſel in 1721, and Gottingen in 1735. A practice ſo beneficial to the ſafety and convenience of mankind, has been very laudably imitated by almoſt every city and town in Europe. *Beckman Hiſt. of Invent.*

LIGHTNING, a bright and vivid flaſh of fire, ſuddenly appearing in the atmoſphere, and commonly diſappearing in an inſtant, ſometimes attended with clouds and thunder, and ſometimes not. For an account of the phenomena of lightning, and of the opinions concerning it, ſee ELECTRICITY *Index*.

Artificial LIGHTNING. Before the diſcoveries of Dr Franklin concerning the identity of electricity and lightning, many contrivances were invented in order to repreſent this terrifying phenomenon in miniature: the coruſcations of phoſphorus in warm weather, the accenſion of the vapour of ſpirit of wine evaporated in a cloſe place, &c. were uſed in order to ſupport the hypotheſis which at that time prevailed; namely, that lightning was formed of ſome ſulphureous, nitrous, or other combuſtible vapours, floating in long trains in the atmoſphere, which by ſome unaccountable means took fire, and produced all the deſtructive effects of that phenomenon. Theſe repreſentations, however, are now no more exhibited; and the only true artificial lightning is univerſally acknowledged to be the diſcharge of electric matter from bodies in which it is artificially ſet in motion by machines.

LIGHTNING was looked upon as ſacred both by the Greeks and Romans, and was ſuppoſed to be ſent to execute vengeance on the earth: Hence perſons killed with lightning, being thought hateful to the gods, were buried apart by themſelves, leſt the aſhes of other men ſhould receive pollution from them. Some ſay they were interred upon the very ſpot where they died; others will have it that they had no interment, but were ſuffered to rot where they fell, becauſe it was unlawful for any man to approach the place. For this reaſon the ground was hedged in, leſt any perſon unawares ſhould contract pollution from it. All places ſtruck with lightning were carefully avoided and fenced round, out of an opinion that Jupiter had either taken offence at them, and fixed upon them the marks of his diſpleaſure, or that he had, by this means, pitched upon them as ſacred to himſelf. The ground thus fenced about was called by the Romans *bidentul*. Lightning was much obſerved in augury, and was a good or bad omen, according to the circumſtances attending it.

LIGNICENCIS TERRA, in the *Materia Medica*, the name of a fine yellow bole found in many parts of Germany, particularly about Emeric in the circle of Weſtphalia, and uſed as an aſtringent.

LIGNUM VITÆ. See GUAIACUM, BOTANY and MATERIA MEDICA *Index*.

LIGNUM *Aloes*. See EXCOECARIA, BOTANY *Index*.

LIGNUM *Nephriticum*. See GUILANDINA, BOTANY *Index*.

LIGNUM *Rhodium*, or *Roſewood*, in the *Materia Medica*; a wood, or root, chiefly brought from the Canary iſlands.

The taſte of this wood is ſlightly bitteriſh, and ſomewhat pungent: its ſmell is very fragrant, reſembling

Lignum ‖ Lilburne.

that of roſes: long kept, it ſeems to loſe its ſmell; but on cutting, or rubbing one piece againſt the other, it ſmells as well as at firſt. Diſtilled with water, it yields an odoriferous eſſential oil, in very ſmall quantity. Rhodium is at preſent in eſteem only upon account of its oil, which is employed as a high and agreeable perfume.

Lignum Campechenſe. See HEMATOXYLUM, BOTANY *Index*.

Lignum Colubrinum. See OPHIORHIZA.

LIGULATED, among botaniſts, an appellation given to ſuch floſcules as have a ſtraight end turned downwards, with three indentures, but not ſeparated into ſegments.

LIGURIA, in *Ancient Geography*, a country of Italy, bounded on the ſouth by the Mediterranean ſea, on the north by the Apennine mountains, on the weſt by part of Tranſalpine Gaul, and on the eaſt by Etruria. There is a great diſagreement among authors concerning the origin of the Ligurians, though moſt probably they were deſcended from the Gauls. Some carry up their origin as far as the fabulous heroes of antiquity; while others trace them from the Ligyes, a people mentioned by Herodotus as attending Xerxes in his expeditions againſt Greece. Theſe Ligyes are by ſome ancient geographers placed in Colchis; by others, in Albania.—According to Diodorus Siculus, the Ligurians led a very wretched life; their country being entirely overgrown with woods, which they were obliged to pull up by the root, in order to cultivate their land, which was alſo encumbered with great ſtones, and, being naturally barren, made but very poor returns for all their labour. They were much addicted to hunting; and, by a life of continual exerciſe and labour, became ſo ſtrong, that the weakeſt Ligurian was generally an overmatch for the ſtrongeſt and moſt robuſt among the Gauls. The women are ſaid to have been almoſt as ſtrong as the men, and to have borne an equal ſhare in all laborious enterpriſes. With all their bravery, however, they were not able to reſiſt the Roman power; but were ſubdued by that warlike nation, about 211 B. C.

LIGUSTICUM, LOVAGE; a genus of plants belonging to the pentandria claſs; and in the natural method ranking under the 45th order, *Umbellatæ*. See BOTANY *Index*.

LIGUSTRUM, PRIVET; a genus of plants belonging to the diandria claſs; and in the natural method ranking under the 44th order, *Sepiariæ*. See BOTANY *Index*.

LILBURNE, JOHN, an enthuſiaſtic demagogue, who was tyrannically puniſhed by the ſtar-chamber court, being put in the pillory, whipped, fined, and impriſoned, for importing and publiſhing ſeditious pamphlets, which he had got printed in Holland; they chiefly reflected on the church of England and its biſhops. He ſuffered in 1637, and in priſon was doubly loaded with irons. In 1641, he was releaſed by the long parliament; and from this time he had the addreſs to make himſelf formidable to all parties, by his bold, aſpiring genius. He ſignalized himſelf in the parliament army; and was at one time the ſecret friend and confidant of Cromwell, and at another his avowed enemy and accuſer; ſo that, in 1650, Cromwell found it to be his intereſt to ſilence him, by a grant of ſome forfeited eſtates. But after this, he grew outrageous againſt the protector's government; became chief of the levellers; and was twice tried for high treaſon, but acquitted by the juries. The laſt was for returning from exile (having been baniſhed by the parliament) without a paſs. He died in 1657, aged 88.

Lilburne ‖ Lilly.

LILIACEOUS, in *Botany*, an appellation given to ſuch flowers as reſemble thoſe of the lily.

LILIUM, the LILY; a genus of plants belonging to the hexandria claſs, and in the natural method ranking under the 10th order, *Coronariæ*. See BOTANY *Index*.

LILLO, GEORGE, an excellent dramatic writer, was born at London in 1693. He was a jeweller by profeſſion, and followed his buſineſs for many years in that neighbourhood with the faireſt reputation. He was at the ſame time ſtrongly attached to the muſes, yet ſeemed to have laid it down as a maxim, that the devotion paid to them ought always to tend to the promotion of virtue, morality, and religion. In purſuance of this aim, Lilly was happy in the choice of his ſubjects, and ſhowed great power of affecting the heart, by working up the paſſions to ſuch a height as to render the diſtreſſes of common and domeſtic life equally intereſting to the audiences as that of kings and heroes, and the ruin brought on private families by an indulgence of avarice, luſt, &c. as the havock made in ſtates and empires by ambition, cruelty, or tyranny. His "George Barnwell," "Fatal Curioſity," and "Arden of Feverſham," are all planned on common and well known ſtories; yet they have perhaps more frequently drawn tears from an audience than the more pompous tragedies of Alexander the Great, All for Love, &c. In the prologue to "Elmeric," which was not acted till after the author's death, it is ſaid, that when he wrote that play, he "was depreſſed by want," and afflicted by diſeaſe; but in the former particular there appears to be evidently a miſtake, as he died poſſeſſed of an eſtate of 60l. a-year, beſides other effects to a conſiderable value. His death happened in 1739, in the 47th year of his age. His works have been collected, and publiſhed, with an account of his life, in 2 vols 12mo.

LILLY, JOHN, a dramatic poet, was born in the Wealds of Kent, about the year 1553, and educated in Magdalen-college, Oxford, where he took the degree of bachelor of arts in 1573, and that of maſter in 1575. From Oxford he removed to Cambridge; but how long he continued there, is uncertain. On his arrival in London, he became acquainted with ſome of Queen Elizabeth's courtiers, by whom he was careſſed, and admired as a poet and a wit; and her majeſty, on particular occaſions, honoured his dramatic pieces with her preſence. His plays are nine in number. His firſt publication, however, printed in 1580, was a romance called *Euphues*, which was univerſally read and admired. This romance, which Blount, the editor of ſix of his plays, ſays introduced a new language, eſpecially among the ladies, is, according to Berkenhout, in fact a moſt contemptible piece of affectation and nonſenſe: nevertheleſs it ſeems very certain, that it was in high eſtimation by the women of faſhion of thoſe times, who, we are told by Whalley, the editor of Ben Johnſon's works, had all the phraſes by heart;

and thoſe who did not ſpeak *Euphuiſm* were as little regarded at court as if they could not ſpeak French. "He was (ſays Oldys) a man of great reading, good memory, ready faculty of application, and uncommon eloquence; but he ran into a vaſt exceſs of alluſion." When or where he died is not known. Anthony Wood ſays he was living in 1597, when his laſt comedy was publiſhed. After attending the court of Queen Elizabeth 13 years, notwithſtanding his reputation as an author, he was under a neceſſity of petitioning the queen for ſome ſmall ſtipend to ſupport him in his old age. His two letters or petitions to her majeſty on this ſubject are preſerved in manuſcript.

Lilly, *William*, a noted Engliſh aſtrologer, born in Leiceſterſhire in 1602; where his father not being able to give him more learning than common writing and arithmetic, he reſolved to ſeek his fortune in London. He arrived in 1620, and lived four years as a ſervant to a mantua-maker in the pariſh of St Clements Danes; but then moved a ſtep higher to the ſervice of Mr Wright, maſter of the Salters company in the Strand, who not being able to write, Lilly among other offices kept his books. In 1627, when his maſter died, he paid his addreſſes to the widow, whom he married with a fortune of 1000l. Being now his own maſter, he followed the puritanical preachers; and, turning his mind to judicial aſtrology, became pupil to one Evans, a profligate Welſh parſon, in that pretended art. Getting a MS. of the *Ars Notitia* of Corn. Agrippa, with alterations, he drank in the doctrine of the magic circle, and the invocation of ſpirits, with great eagerneſs. He was the author of the *Merlinus Anglicus junior*; The Supernatural Sight; and The White King's Prophecy. In him we have an inſtance of the general ſuperſtition and ignorance that prevailed in the time of the civil war between Cha. I. and his parliament: for the king conſulted this aſtrologer to know in what quarter he ſhould conceal himſelf, if he could eſcape from Hampton court; and General Fairfax, on the other ſide, ſent for him to his army, to aſk him if he could tell by his art, whether God was with them and their cauſe? Lilly, who made his fortune by favourable predictions to both parties, aſſured the general that God would be with him and his army. In 1648, he publiſhed his Treatiſe of the Three Suns ſeen the preceding winter; and alſo an aſtrological judgement upon a conjunction of Saturn and Mars. This year the council of ſtate gave him in money 50l. and a penſion of 100l. per annum, which he received for two years, and then reſigned on ſome diſguſt. In June 1660, he was taken into cuſtody by order of the parliament, by whom he was examined concerning the perſon who cut off the head of King Charles I. The ſame year he ſued out his pardon under the great ſeal of England. The plague raging in London, he removed with his family to his eſtate at Herſham; and in October 1666 was examined before a committee of the houſe of commons concerning the fire of London, which happened in September that year. After his retirement to Herſham, he applied himſelf to the ſtudy of phyſic, and, by means of his friend Mr Aſhmole, obtained from Archbiſhop Sheldon a licenſe for the practice of it. A little before his death he adopted for his ſon, by the name of *Merlin junior*, one Henry Coley, a taylor by trade; and at the ſame time gave him the impreſſion of his almanac, after it had been printed for 36 years. He died in 1681 of a dead palſy. Mr Aſhmole ſet a monument over his grave in the church of Walton upon Thames. His "Obſervations on the Life and Death of Charles late King of England," if we overlook the aſtrological nonſenſe, may be read with as much ſatisfaction as more celebrated hiſtories; Lilly being not only very well informed, but ſtrictly impartial. This work, with the Lives of Lilly and Aſhmole, written by themſelves, were publiſhed in one vol. 8vo, in 1774, by Mr Burman.

LILY. See Lilium, Botany *Index*.

Lily of the Valley. See Convallaria, Botany *Index*.

LILYBÆUM, in *Ancient Geography*, a city of Sicily, ſituated on the moſt weſterly promontory of the iſland of Sicily, and ſaid to have been founded by the Carthaginians on their expulſion from Motya by Dionyſius tyrant of Syracuſe. It is remarkable for three ſieges it ſuſtained; one againſt Dionyſius the tyrant, another againſt Pyrrhus king of Epirus, and the third againſt the Romans. The two firſt failed in their attempts, but the Romans with great difficulty made themſelves maſters of it. No remains of this once ſtately city are now to be ſeen, except ſome aqueducts and temples; though it was ſtanding in Strabo's time.

LILYE, William, the grammarian, was born in the year 1466 at Oldham in Hampſhire; and in 1486 was admitted a ſemi-commoner of Magdalen college in Oxford. Having taken the degree of bachelor of arts, he left the univerſity, and travelled to Jeruſalem. Returning from thence, he continued five years in the iſland of Rhodes, where he ſtudied the Greek language, ſeveral learned men having retired thither after the taking of Conſtantinople. From Rhodes he travelled to Rome; where he improved himſelf in the Greek and Latin languages, under Sulpitius and P. Sabinus. He then returned to London, where for ſome time he taught a private grammar-ſchool, being the firſt perſon who taught Greek in the metropolis. In 1510, when Dr Colet founded St Paul's ſchool, Lilye was appointed the firſt maſter; at which time, it ſeems, he was married and had many children. In this employment he had laboured 12 years, when, being ſeized by the plague, which then raged in London, he died in February 1523, and was buried in the north yard of St Paul's. He had the character of an excellent grammarian, and a ſucceſsful teacher of the learned languages. His principal work is *Breviſſima inſtitutio, ſeu ratio grammatices cognoſcendæ*; Lond. 1513. Reprinted times without number, and commonly called *Lilye's grammar*. The Engliſh rudiments were written by Dr Colet, dean of St Paul's; and the preface to the firſt edition, by Cardinal Wolſey. The Engliſh ſyntax was written by Lilye; alſo the rules for the genders of nouns, beginning with *propria quæ maribus*; and thoſe for the preterperfect tenſes and ſupines, beginning with *As in preſenti*. The Latin ſyntax was chiefly the work of Eraſmus. See Ward's preface to his edition of Lilye's Grammar, 1732.

LIMA, the metropolis of Peru, contains 209 ſquares of buildings, which compriſe 8222 doors of dwelling houſes and ſhops, and theſe are branched out into 355 ſtreets. In order to maintain peace and tranquillity among

Lima.

the inhabitants, and for the accommodation of the police, the city is divided into four quarters, containing 35 districts, over each of which there presides an alcalde, who is always elected from among the people of the most diſtinguiſhed rank. The population, according to eſtimates made at different periods, is as follows.

In 1600,	-	14,262
1614,	-	25,455
1700,	-	37,259
1746,	-	60,000
1755,	-	54,000
1781,	-	60,000
1790,	-	52,627

By this table it appears, that from 1746 to 1755, the population ſuffered a diminution of 6000, which was owing to an earthquake that happened at the former period;—a calamity with which that city is often viſited. Were it not for this circumſtance, Lima would be a perfect paradiſe, as the adjacent country abounds with corn, wine, oil, ſugar, fruits and flax. Such abundance of wealth do the inhabitants enjoy, that when the duke of Palata was ſent from Spain as viceroy to Peru, they paved the ſtreets through which he was to paſs with ingots of ſilver. Libertiniſm and debauchery are the diſtinguiſhing characteriſtics of the people of Lima, for which even the nuns are as notorious as the reſt of the females, ſeldom being free from venereal complaints.

In the month of March 1543, the emperor Charles V. eſtabliſhed an audience at Lima, in conſequence of which the inhabitants were freed from the painful neceſſity of ſeeking a redreſs of their grievances at ſo great a diſtance as Panama. Among the excellent inſtitutions by which the Peruvian capital is diſtinguiſhed we may rank the provincial councils, which ſhew the conſtant zeal of the ſovereigns of Spain for the defence of religion and preſervation of diſcipline. The prelates, by their paſtoral vigilance, ſpare neither pains nor labour to promote their views, to accompliſh their ſacred and intereſting purpoſes.

By a decree of the Spaniſh emperor, which reached Lima in 1553, a univerſity was begun in a central ſpot of the capital, called the univerſity of St Mark, which is now in a moſt flouriſhing condition. Don Franciſco Toledo aſſigned 20,312 piaſtres as a fund for the maintenance of the profeſſors, ariſing from the tributes paid by the Indians. Two lectures are given daily on grammar, one on the Indian language, three on philoſophy, three on theology, three on law, two on canons, and two on medicine. In the year 1790 an amphitheatre was erected for the uſe of the anatomical ſtudents.

The college for female orphans was founded by Mateo Paſtor De Velaſco, not at the hour of death, which often gives to charitable endowments an air of ſuſpicion, but when he was in the full poſſeſſion of perfect health. In 1597 a pious philoſopher founded a charitable inſtitution for the ſupport of ſuch helpleſs children as were laid down in the ſtreets by their unfeeling parts. This building was deſtroyed by the earthquake of 1687, which laid in ruins the greater part of the city. It was afterwards rebuilt and is at preſent in a flouriſhing condition. In 1559 an hoſpital was erected for the relief of the unfortunate ſick, who might otherwiſe have periſhed for want of medical aid, and obtained the name of the *Fellowſhip of Charity and Compaſſion*. A general hoſpital for the poor was begun about 1758, but not completed till 1770, which in 1790 afforded a comfortable aſylum to 29 poor people. The aſylum for penitent females was founded in 1709. It has been ſaid that there is not a city in the world in which ſo many alms are diſtributed as in Lima.

In the centre of the great ſquare there is a fountain of bronze, the ornaments of which are conformable to the rules of the compoſite order. It has an elevation of 15¼ yards to the helmet of Fame, from which deducting 1¾ yards for the height of that figure, the remainder gives the part to which the water riſes in order to diffuſe itſelf. This production of art, combining magnificence in every part of it with fine architectural taſte, is ſurrounded by 24 pieces of artillery, and 16 iron chains, a narrow ſpace being left for acceſs to the inhabitants.

Coffee-houſes were not known in Lima till the year 1771, when one was opened in the ſtreet of Santo Domingo, and another the year following. A third was eſtabliſhed in 1775, a fourth in 1782, and a fifth in 1788, in each of which there is a billiard table for the amuſement of the inhabitants. We are ſorry to ſay that the barbarous practice of cock-fighting obtains in Lima, for which purpoſe a building was erected in the year 1762. The tennis court is open to the public, and affords the ſpectator an agreeable hour of relaxation from more ſerious purſuits. Lima is ſituated in W. Long. 76. 44. S. Lat. 12. 1.

Mariti's Travels through Cyprus.

LIMASSOL, or Limisso, a town of Cyprus, in the ſouth of the iſland. Of the ancient city nothing but ruins now remains; though it was a celebrated place, even under the government of the dukes. King Richard, the conqueror of the laſt of theſe vaſſals of the empire, razed it in 1191, and it was never afterwards rebuilt. This city originally was the ſame as AMATHUS, or Amathonte; ſo famous, as Pauſanias tells us, for its temple erected in honour of Venus and Adonis. Amathus was the reſidence of the nine firſt kings of the iſland; and, amongſt others of Oneliſtus, who was ſubjected afterwards by the arms of Artabanes, the Perſian general. This city, erected into an archbiſhopric in the time of the Chriſtians, has produced a number of perſonages celebrated for their knowledge and the ſanctity of their lives. In the neighbourhood there are ſeveral copper mines, which the Turks have been forced to abandon. The following lines, in the tenth book of Ovid's Metamorphoſes, prove that they were known in the time of that poet:

Capta viri forma, non jam Cytherea curat
Littora, non alto repetit Paphon æquore cinctam,
Piſcoſamque Gnidon, gravidamque Amathunta metallis.

The place where the new Limaſſol now ſtands formerly had the name of *Nemoſia*, from the multitude of woods by which it was ſurrounded. Richard king of England having deſtroyed Amathonte, Guy de Luſignan, in the 12th century, laid the foundation of that new city which the Greeks called *Neopoleos*. The family of Luſignan, who continued to embelliſh and fortify it, built there palaces, and Greek and Latin churches; and made it the ſeat of a biſhop. When the iſland was taken by the Turks in 1570, the Ottoman army entered this city on the 2d of July, and ravaged it without mercy. It was then deſtroyed by the flames: and at preſent it is only a wretched place, in which one can ſcarcely diſtinguiſh any remains of its ancient edifices. It is governed by a commiſſary and a cadi: the latter judges caſes only proviſionally, before they are carried to the ſuperior tribunal of Nicoſia. The harbour is very commodious; and being ſheltered from impetuous winds, it affords a ſafe and calm aſylum to veſſels when overtaken by a ſtorm. The carob tree is here more abundant than anywhere elſe; and it is from the port of Limaſſol that the greateſt quantity of its fruit is exported. The inhabitants export alſo ſalt, procured from a ſake near Salines. Cotton, wheat, barley, and mulberry trees, are both plentiful and well cultivated in this part of the iſland: the ground alſo produces all kinds of garden ſtuff. The beſt Cyprus wine is made from the vines that grow on the hills of Limaſſol. All the wines of the country are collected in this city to be tranſported to Larnic, where there are the largeſt cellars, and which on that account becomes the natural centre of commerce.

LIMAX, the SLUG, or *Naked Snail;* a genus of animals belonging to the claſs vermes. See HELMINTHOLOGY *Index*.

LIMB, in general, denotes the border or edge of a thing; thus we ſay, the limb of a quadrant, of the ſun, of a leaf, &c.

LIMB, in *Anatomy*, an appellation given to the extremities of the body, as to the arms and legs.

Limb, *Limbus*, in the church of Rome, is uſed in two different ſenſes. 1. The limb of the patriarchs is ſaid to be the place where the patriarchs waited the redemption of mankind: in this place they ſuppoſe our Saviour's ſoul continued from the time of his death to his reſurrection. 2. The limb of infants dying without baptiſm, is a place ſuppoſed to be diſtinct both from heaven and hell; ſince, ſay they, children dying innocent of any actual ſin, do not deſerve hell; and, by reaſon of their original ſin, cannot be admitted into heaven.

LIMBAT, the name of a periodical wind common in the iſland of Cyprus, and of great ſervice in moderating the heats of the climate, which would otherwiſe be intolerable.

According to the abbé Mariti, it begins to blow at eight in the morning the firſt day; increaſes as the ſun advances till noon; then gradually weakens, and at three falls entirely. On the ſecond day it ariſes at the ſame hour; but it does not attain its greateſt ſtrength till about one in the afternoon, and ceaſes at four preciſely. On the third day it begins as before; but it falls an hour later. On the five ſucceeding days, it follows the ſame progreſſion as on the third; but it is remarked, that a little before it ceaſes, it becomes extremely violent. At the expiration of five days it commences a new period like the former. By narrowly obſerving the ſea on that ſide from which it is about to blow, a little before it ariſes, one may determine what degree of ſtrength it will have during the day. If the horizon is clear, and entirely free from clouds, the wind will be weak, and even almoſt inſenſible; but if it is dark and cloudy, the wind will be ſtrong and violent. This limbat wind, notwithſtanding its utility in moderating the exceſſive heat, often becomes the cauſe of fevers, eſpecially to Europeans, from their being leſs habituated to the climate, and more apt than the natives to ſuffer themſelves to be ſurpriſed by the cool air when in a ſtate of perſpiration. This wind, the falling of which happens an hour ſooner or later, is ſucceeded by a calm, accompanied by a certain moiſture that renders the air ſomewhat heavy. This moiſture diſappears in the evening, being diſſipated by a wind which ariſes every day at that period. This wind is conſidered as a land breeze by the inhabitants of the ſouthern and eaſtern parts of the iſland; but it is called *a ſea breeze* by thoſe in the northern and weſtern, who indeed receive it immediately from the ſea. In ſummer it blows till four o'clock in the morning, and when it ceaſes, it leaves a profound calm, which continues till the hour when the limbat commences. In autumn and winter it never falls till daybreak, when it is ſucceeded by other winds, which proceed from the irregularity of the ſeaſon. In ſpring it does not continue longer than midnight; and is then ſucceeded by that happy calm, during which thoſe refreſhing dews are formed that moiſten the earth at ſunriſing. The limbat winds, which ariſe in the beginning of ſummer, ceaſe about the middle of September; and this is the period when the moſt inſupportable heats commence, becauſe their violence is not moderated by the ſmalleſt breeze. They are however, luckily not of long duration; and about the latter end of October they decreaſe ſenſibly, as the atmoſphere begins to be loaded with watery clouds.

LIMBORCH, PHILIP, a learned writer among the remonſtrants, born at Amſterdam in 1633. After having made great proficiency in his ſtudies, he was, in 1655, admitted to preach in public, which he did firſt at Haerlem. His ſermons had in them no affected eloquence; but were ſolid, methodical, and edifying. He was choſen miniſter of Goudja; from whence he was called to Amſterdam, where he had the profeſſorſhip of divinity, in which he acquitted himſelf with great reputation till his death, which happened in 1712. He had an admirable genius, and a tenacious memory. He had many friends of diſtinction in foreign parts as well as in his own country. Some of his letters to Mr Locke are printed with thoſe of that celebrated author. He had all the qualifications ſuitable to the character of a ſincere divine, lived an example of every virtue, and preſerved the vigour of his body and mind to a conſiderable age. He wrote many works, which are eſteemed; the principal of which are, 1. *Amica collatio de veritate religionis Chriſtianæ cum erudito Judæo*, in 12mo. 2. A Complete Body of Divinity, according to the opinions and doctrines of the Remonſtrants. 3. A Hiſtory of the Inquiſition; which has been tranſlated into Engliſh by Dr Samuel Chandler. Limborch alſo publiſhed the works of the famous Epiſcopius, who was his great-uncle by the mother's ſide.

LIMBURGH DUCHY, a province of the Auſtrian Netherlands, bounded by the duchy of Juliers on the north and eaſt, by Luxemburgh on the ſouth, and by the biſhopric of Liege on the weſt. It is about 30 miles in length, and 25 in breadth; and conſiſts of good arable and paſture land, with plenty of wood, and ſome iron mines.

LIMBURGH, the capital city of the duchy of Limburgh,

burgh, in the Auſtrian Netherlands, is ſeated on a ſteep rock near the river Veſſe. This town is ſmall, but pleaſantly ſeated on a hill, with ſhady woods; and conſiſts chiefly of one broad ſtreet, not very well built. It is ſtrong by ſituation, and almoſt inacceſſible; however, it was taken by the French in 1675, and by the confederates under the duke of Marlborough in 1703, for the houſe of Auſtria, to whom it remains by the treaties of Raſtadt and Baden, after having been diſmantled. It is famous for its cheeſe, which is exceeding good. E. Long. 6. 8. N. Lat. 50. 40.

LIME, a peculiar earth. See CHEMISTRY *Index*.

LIME-Tree. See CITRUS, BOTANY *Index*.

LIME or *LINDEN-Tree*. See TILIA, BOTANY *Index*.

LIME-Water. See PHARMACY *Index*.

LIME, or *Lyme*. See LYME.

LIMERICK, a county of Ireland, in the province of Munſter, is bounded on the eaſt by Tipperary, on the weſt by Kerry, on the north by the river Shannon, and on the ſouth by Cork. It is a fruitful and populous tract, the ſoil requiring little or no manure in moſt places: beſides rich paſture for ſheep and cows, it produces rich crops of all kinds of corn and rape, with ſome hemp. It gave title of earl to the family of Donegal. It contains 375,320 Iriſh plantation acres, about 56 church livings, though a much greater number of pariſhes, 10 baronies, three boroughs; and formerly ſent eight members to parliament. It has ſome clays, furze, fern, and mountain lands, and is famous for good cyder; it has been much benefited by the Palatines, who ſettled there and increaſed tillage; they are a laborious independent people, moſtly employed in their own farms. This county is well watered by large and ſmall rivers; the Shannon runs at the north ſide of the county, and fertilizes its banks. The firing of the inhabitants is chiefly turf, and the bogs are conveniently ſituated. At Loghill in the weſt of the county, there is a mine of coal or culm, but it is more uſed in kilns than in houſes. There are few lakes except Lough Gur; and the principal hills are Knockgreny, Knockany, Knokfiring and Toryhill. The mountains lie weſtward, the higheſt being Knockpatrick or St Patrick's hill. This county is about 45 miles long and 42 broad.

LIMERICK, or *Lough-Meath*, a market town, a borough, and a biſhop's ſee, now the metropolis of the province of Munſter. It is ſituated on the river Shannon, 94 miles from Dublin; and was the ſtrongeſt fortreſs in the kingdom. Its ancient name was Lunneach; and during the firſt ages it was much frequented by foreign merchants, and after the arrival of the Danes was a place of conſiderable commerce until the 12th century. It was plundered by Mahon, brother of Brien Boromh, after the battle of Sulchoid, in 970; and Brien, in a future period, exacted from the Danes of this city 365 tons of wine as a tribute, which ſhows the extenſive traffic carried on by thoſe people in that article. About the middle of the 6th century, St Munchin erected a church and founded a biſhopric here; which, however, was deſtroyed by the Danes on their taking poſſeſſion of this port in 853, and remained in ruins until their converſion to the Chriſtian faith in the 10th century: at which period the church of St Munchin was rebuilt, and the biſhopric eſtabliſhed. Donald O'Brien, about the time of the arrival of the Engliſh, founded and endowed the cathedral; and Donat O'Brien, biſhop of Limerick, in the 13th century, contributed much to the opulence of the ſee. About the cloſe of the 12th century, the biſhopric of Innis-Cathay was united to that of Limerick. It was beſieged by King William III. in the year 1690, and though there was no army to aſſiſt it, the king was obliged to raiſe the ſiege. In the year 1691, it was again beſieged by the Engliſh and Dutch on the 21ſt of September; and it was obliged to ſurrender on the 13th of October following, not without the loſs of abundance of men; however, the garriſon had very honourable and advantageous conditions, being permitted to retire where they thought fit, and the Roman catholics by theſe articles were to be tolerated in the free exerciſe of their religion. Within a century this place was reckoned the ſecond city in Ireland; at preſent it has loſt its rank; not becauſe it thrives leſs, but becauſe Cork thrives more. It is compoſed of the Iriſh and Engliſh town; the latter ſtands on the King's iſland, formed by the river Shannon. The town is three miles in circumference, having weekly markets on Wedneſday and Saturday, and fairs on Eaſter Tueſday, 1ſt July, 4th Auguſt, and 12th December. There is a privilege annexed to the fair held on 4th Auguſt, that, during 15 days, no perſon can be arreſted in the city or liberties, on any proceſs iſſuing out of the tholſel court of Limerick. Ardfert and Achadoe, in the county of Kerry, are united to the biſhopric of Limeric. This city formerly returned two members to parliament; and gives title of viſcount to the family of Hamilton. It is governed by a mayor, ſheriffs, recorder, aldermen, and burgeſſes; there is alſo a barrack and a military governor and town major: it had ſome time the privilege of coinage; and different parliaments have been held there. The town was formerly entirely walled in; and in 1760, there were 17 of the city gates ſtanding; but to the great improvement of the place they are now all demoliſhed, except the watergate of King John's caſtle. The linen, woollen, and paper manufactures, are carried on here to great extent, and the export of proviſions is very conſiderable. Here are many charitable hoſpitals, and handſome public buildings, beſides the cathedral and other churches. A charter was granted to this city by King John, and confirmed in ſucceeding reigns. Dr Campbell obſerves, that as you approach Limerick, the grounds grow rich and exquiſitely beautiful; the only diſagreeable matter is, that the ſituation renders the air moiſt, and conſequently rather unwholeſome to ſtrangers. About ſix miles from this is the famous Caſtleconnel ſpa. Limerick is 50 miles from Cork, 50 from Galway, and 73 from Waterford. It appears that Limerick obtained the privilege of having mayors 10 years before that right was allowed to the citizens of London. It was before governed by provoſts, of which the firſt was John Spafford in 1195 and 1197; during the provoſtſhip of Henry Troy a charter was granted, 9 Richard I. whereby the citizens were allowed to chooſe mayors and bailiffs, Adam Servant, in 1198, being the firſt mayor. It continued to be governed by mayors and bailiffs, until the office of bailiff was changed into that of ſheriff in 1609.

Limerick is alſo the name of a fair-town in the county of Wexford and province of Leinſter; the fairs are four in the year.

LIMINGTON, a town of Hampſhire in England. See Lymington.

LIMIT, in a reſtrained ſenſe, is uſed by mathematicians for a determined quantity to which a variable one continually approaches; in which ſenſe, the circle may be ſaid to be the limit of its circumſcribed and inſcribed polygons. In *Algebra*, the term *limit* is applied to two quantities, one of which is greater and the other leſs than another quantity; and in this ſenſe it is uſed in ſpeaking of the limits of equations, whereby their ſolution is much facilitated.

LIMITED problem, denotes a problem that has but one ſolution, or ſome determinate number of ſolutions; as to deſcribe a circle through three given points that do not lie in a right line, which is limited to one ſolution only; to divide a parallelogram into two equal parts by a line parallel to one ſide, which admits of two ſolutions, according as the line is parallel to the length or breadth of the parallelogram; or to divide a triangle in any ratio by a line parallel to one ſide, which is limited to three ſolutions, as the line may be parallel to any of the three ſides.

LIMME, a town of Kent, in England, near Hithe, and four miles from Romney, was formerly a port, till choked up by the ſands; and though it is thereby become a poor town, yet it has the horn and mace and other tokens left of its ancient grandeur, and uſed to be the place where the lord warden of the cinque ports was ſworn at his entrance upon his office. The Roman road from Canterbury, called *Stane ſtreet*, ended here; and from the brow of its hill may be ſeen the ruinous Roman walls almoſt at the bottom of the marſhes. Here formerly was a caſtle, now converted into a farm-houſe. When or by whom this edifice was erected is not known. It has, however, great marks of antiquity; as has alſo the adjoining church, on which are ſeveral old tombſtones with croſſes on them.

LIMNING, the art of painting in water colours, in contradiſtinction to painting which is done in oil-colours.

Limning is much the more ancient kind of painting. Till a Flemiſh painter, one John van Eyck, better known by the name of *John of Bruges*, found out the art of painting in oil, the painters all painted in water and in freſco, both on their walls, on wooden boards, and elſewhere. When they made uſe of boards, they uſually glued a fine linen cloth over them, to prevent their opening; then laid on a ground of white; laſtly, they mixed up their colours with water and ſize, or with water and yolks of eggs, well beaten with the branches of a fig tree, the juice whereof thus mixed with the eggs; and with this mixture they painted their pieces.

In limning, all colours are proper enough, except the white made of lime, which is only uſed in freſco. The azure and ultramarine muſt always be mixed with ſize or gum; but there are always applied two layers of hot ſize before the ſize colours are laid on: the colours are all ground in water each by itſelf; and, as they are required in working, are diluted with ſize water. When the piece is finiſhed, they go over it with the white of an egg well beaten; and then with varniſh, if required.

To limn, or draw a face in colours: Having all the materials in readineſs, lay the prepared colour on the card even and thin, free from hairs and ſpots, over the place where the picture is to be. The ground being laid, and the party placed in a due poſition, begin the work, which is to be done at three ſittings. At the firſt you are only to dead-colour the face, which will require about two hours. At the ſecond ſitting, go over the work more curiouſly, adding its particular graces or deformities. At the third ſitting, finiſh the whole; carefully remarking whatever may conduce to render the piece perfect, as the caſt of the eyes, moles, ſcars, geſtures, and the like.

LIMOGES, an ancient town of France, in the late province of Guienne, and capital of the department of Upper Vienne, with a biſhop's ſee. It is a trading place, and its horſes are in great eſteem. It is ſeated on the river Vienne, in E. Long. 1. 20. N. Lat. 45. 50.

LIMOSIN, a late province of France, now the department of Upper Vienne, bounded on the north by La Marche, on the eaſt by Auvergne, on the ſouth by Quercy, and on the weſt by Perigord and Angoumois. One part is very cold, but the other more temperate. It is covered with foreſts of cheſnut trees; and contains mines of lead, copper, tin, and iron; but the principal trade conſiſts in cattle and horſes.

LIMPET, a genus of ſhell-fiſh. See Patella, Conchology *Index*.

LIMPURG, a barony of Germany, in the circle of Franconia, included almoſt entirely within Suabia, and ſeated to the ſouth of Hall in Suabia. It is about 15 miles long, and eight broad. Gaildorf and Shonburg, near which is the caſtle of Limpurg, are the principal places.

Limpurg, a town of Germany, in the electorate of Triers or Treves, and in Wetteravia, formerly free and imperial, but now ſubject to the electorate of Treves. It is ſeated on the river Lhon. E. Long. 8. 13. N. Lat. 50. 18.

LINARIA. See Fringilla, Ornithology *Index*.

LINACRE, Thomas, phyſician, was born at Canterbury about the year 1460, and there educated under the learned William Selling: thence he removed to Oxford, and in 1484 was choſen fellow of All-Soul's college. Tilly, *alias* Selling, his former inſtructor, being at this time appointed ambaſſador from King Henry VII. to the court of Rome, Mr Linacre accompanied him to Italy, where he attained the higheſt degree of perfection in the Greek and Latin languages. At Rome, he applied himſelf particularly to the ſtudy of Ariſtotle and Galen, in the original. On his return to Oxford, he was incorporated doctor of phyſic, and choſen public profeſſor in that faculty. But he had not been long in England, before he was commanded to court by King Henry VII. to attend the young prince Arthur as his tutor and phyſician. He was afterwards appointed phyſician to the king, and after his death, to his ſucceſſor Henry VIII. Dr Linacre founded two medical lectures at Oxford, and one at Cambridge; but that which moſt effectually immortalized his name among the faculty, is his being the firſt founder of the college of phyſicians in London. He beheld with vexation the wretched ſtate of phyſic in thoſe times; and, by an application to Cardinal Wolſey, obtained a patent in 1518, by which the phyſicians of London were incorporated. The intention of this corporation was to prevent illiterate and ignorant medicaſters from practiſing the art of healing. Dr Linacre was the firſt preſident, and held the office as long as he lived. Their meetings were in his own houſe in Knight-rider ſtreet, which houſe he bequeathed to the college. But our doctor, when he was about the age of 50, took it into his head to ſtudy divinity; entered into orders; and was collated, in 1509, to the rectory of Merſham. In the ſame year he was inſtalled prebendary of Wells, in 1518 prebendary of York, and in the following year was admitted precentor of that cathedral. This, we are told, he reſigned for other preferments. He died of the ſtone in the bladder in October 1524, aged 64; and was buried in St Paul's. Thirty-three years after his death, Doctor John Caius cauſed a monument to be erected to his memory, with a Latin inſcription, which contains the outlines of his life and character. He was a man of great natural ſagacity, a ſkilful phyſician, a profound grammarian, and one of the beſt Greek and Latin ſcholars of his time. Eraſmus in his epiſtles ſpeaks highly of the Doctor's tranſlations from Galen, preferring them even to the original Greek. His works are, 1. *De emendata ſtructura Latini ſermonis, libri ſex;* London, printed by Pynſon, 1524, 8vo, and by Stephens, 1527, 1532. 2. The Rudiments of Grammar, for the uſe of the princeſs Mary, printed by Pynſon. Buchanan tranſlated it into Latin; Paris, 1536. He likewiſe tranſlated into very elegant Latin ſeveral of Galen's works, which were printed chiefly abroad at different times. Alſo *Procli Diadachi ſphæra*, tranſlated from the Greek; Venet. 1499, 1500.

LINCOLN, a city of England, and capital of a county of the ſame name, is diſtant 132 miles from London. It ſtands on the ſide of a hill; at the bottom of which runs the river Witham in three ſmall channels, over which are ſeveral bridges. The old *Lindum* of the Britons, which ſtood on the top of the hill, as appears from the veſtiges of a rampart, and deep ditches ſtill remaining, was taken and demoliſhed by the Saxons; who built a town upon the ſouth ſide of the hill down to the river ſide, which was ſeveral times taken by the Danes, and as often retaken by the Saxons. In Edward the Confeſſor's time, it appears, from Doomſday-book, to have been a very conſiderable place; and in the time of the Normans, Malmſbury ſays, it was one of the moſt populous cities in England. William I. built a caſtle upon the ſummit of the hill above the town. The dioceſe, though the biſhopric of Ely was taken out of it by Henry II. and thoſe of Peterborough and Oxford by Henry VIII. is ſtill vaſtly large, containing the counties of Leiceſter, Huntingdon, Bedford, and part of Bucks, making 1255 pariſhes. Though the other churches are mean, the cathedral or minſter is a moſt magnificent piece of Gothic architecture. Here is a prodigious large bell, called *Tom of Lincoln*, which is near five ton in weight, and 23 feet in compaſs. The hill on which the church ſtands is ſo high, and the church itſelf ſo lofty, that it may be ſeen 50 miles to the north and 30 to the ſouth. Beſides other tombs, it contains one of braſs, in which are the entrails of Queen Eleanor, wife to Edward I. It is ſaid there were anciently 52 churches, which are now reduced to 14. Such is the magnificence and elevation of the cathedral, that the monks thought the ſight of it muſt be very mortifying to the devil; whence it came to be ſaid of one who was diſpleaſed, *that he looked like the devil over Lincoln.* The declivity on which the city is built being ſteep, the communication betwixt the upper and lower town is very troubleſome, and coaches and horſes are obliged to make a compaſs.

King Edward III. made this city a ſtaple for wool, leather, lead, &c. It was once burnt; once beſieged by King Stephen, who was here defeated and taken priſoner; and once taken by Henry III. from his rebellious barons. It abounded heretofore with monaſteries and other religious houſes. There is a great pool here, formed by the river on the weſt ſide of it, called *Swan Pool*, becauſe of the multitude of ſwans on it. The Roman north gate ſtill remains entire, by the name of *Newport Gate*. It is one of the nobleſt of this ſort in Britain. It is a vaſt ſemicircle of ſtones of very large dimenſions laid without mortar, connected only by their uniform ſhape. This magnificent arch is 16 feet in diameter, the ſtones are four feet thick at the bottom. It ſeems to have a joint in the middle not a keyſtone: and on both ſides, towards the upper part, are laid horizontal ſtones of great dimenſions, ſome 10 or 12 feet long. This arch riſes from an impoſt of large mouldings, which are not perceivable now; there are alſo divers fragments of the old Roman wall. Over againſt the caſtle is an entrenchment caſt up by King Stephen; and here are carved the arms of John of Gaunt duke of Lancaſter, who lived here like a king, and had a mint. The city has a communication with the Trent, by a canal called the Foſs-dyke. In the centre of the old ruined caſtle there is a handſome modern ſtructure for holding the aſſizes. Its walls are almoſt entire, and very ſubſtantial: the keep or principal tower is ſituated on a high and very ſteep mount, which yet continues in its original ſtate, but the remains of the tower on it are only five or ſix yards high. The outer walls of the caſtle are of very conſiderable height, which appear ſtill higher than they really are from their lofty ſituation and the moat below them. The great gateway is ſtill entire. This city is a county of itſelf, and has a viſcountial juriſdiction, for 20 miles round, which is a privilege that no other city in England can equal. It now conſiſts principally of one ſtreet above two miles long, well paved, beſides ſeveral croſs and parallel ſtreets well peopled. Here are ſome very handſome modern buildings, but more antique ones; upon the whole, it has an air of ancient greatneſs, ariſing in a great meaſure from the number of monaſtic remains, moſt of which are now converted into ſtables, out-houſes, &c. Upon the hill, in the caſtle, are the ruins of the biſhop's palace, and other ruins of ancient grandeur and magnificence. The city is ſupplied with water by ſeveral conduits, among which is a modern one, ſomewhat in the pyramidical ſtyle, enriched with ſculpture. It is governed by a mayor, twelve aldermen, two ſheriffs, a recorder, four chamberlains, a ſwordbearer, four coroners, and above forty common-council men. Here are four charity ſchools, where 120 poor children are taught by the widows of clergymen. The neighbouring courſe is noted for its frequent horſe-races. On the down of Lincoln, towards Boſton, that rare fowl the buſtard is ſometimes ſeen, as well as on Saliſbury Plain. Lincoln-Heath extends above 50 miles, viz. from Sleaford and Ancaſter ſouth to the Humber north, though it is but three or four miles over where broadeſt. Five miles from Boſton on this extenſive heath, Lord le Deſpenſer built a tower for the direction of ſtrangers. It is a lofty ſquare building with a ſtaircaſe, terminating in a flat roof, and round the baſe is a ſquare court-yard. Great part of this extenſive heath has been encloſed. We read that David king of Scots met King John here, on the 22d of November, in the third year of his reign, and performed homage to him on a hill without the city, for his Engliſh territories, in preſence of the archbiſhops of Canterbury, York, and Raguſa, 13 biſhops, and a vaſt number of temporal lords and knights. King Henry VII. kept his court here at Eaſter in 1486. The Jews were once its chief inhabitants, till they were forced to remove, after having impiouſly crucified the child of one Grantham, and thrown it into a well, to this day called *Grantham's Well*. Lincoln has given the title of earl to the family of Clinton ever ſince the reign of Queen Elizabeth. W. Long. 27. 1. N. Lat. 53. 16.

Lincoln Shire, a maritime county of England, 77 miles in length and 48 in breadth, is bounded on the eaſt by the German ocean, on the weſt by Nottinghamſhire, on the north by Yorkſhire, on the ſouth by Rutlandſhire, Northamptonſhire, and Cambridgeſhire. It contains 631 pariſhes, and 31 market towns, and returns 12 members to parliament. The principal rivers are the Humber, the Trent, the Witham, the Nenn, the Welland, the Ankham, and the Dun. It is divided into three parts, Lindſay, Keſtoven, and Holland; the air of which laſt is unwholeſome and foggy, on account of the fens and large marſhes. The ſoil of the north and weſt parts is very fertile, and abounds in corn and paſtures. The eaſt and ſouth parts are not ſo proper for corn; but then they ſupply them with fiſh and fowl in great plenty, particularly ducks and geeſe. Lincoln is the principal town. By inland navigation, this county has communication with the rivers Merſey, Dee, Ribble, Ouſe, Darwent, Severn, Thames, Avon, &c. which navigation, including its windings, extends above 500 miles through different counties.

This county in 1801, contained 41,395 houſes, inhabited by 42,629 families; and the total number of inhabitants amounted to 208,557.

LINDESFARN, or Landisfarn. See *Holy-Iſland.*

LINDSAY, Sir David, a celebrated Scots poet, was deſcended of an ancient family, and born in the reign of King James IV. at his father's ſeat, called the *Mount*, near Cupar, in Fifeſhire. He was educated at the univerſity of St Andrew's; and, after making the tour of Europe, returned to Scotland in the year 1514. Soon after his arrival, he was appointed gentleman of the bedchamber to the king, and tutor to the young prince, afterwards James V. From the verſes prefixed to his dream, we learn that he enjoyed ſeveral other honourable employments at court: but, in 1533, he was deprived of all his places, except that of *Lion king at arms*, which he held to the time of his death. His diſgrace was moſt probably owing to his invectives againſt the clergy, which are frequent in all his writings. After the deceaſe of King James V. Sir David became a favourite of the earl of Arran, regent of Scotland; but the abbot of Paiſley did not ſuffer him to continue long in favour with the earl. He then retired to his paternal eſtate, and ſpent the remainder of his days in rural tranquillity. He died in the year 1553. His poetical talents, conſidering the age in which he wrote, were not contemptible; but he treats the Romiſh clergy with great ſeverity, and writes with ſome humour: but, whatever merit might be formerly attributed to him, he takes ſuch licentious liberties with words, ſtretching or carving them for meaſure or rhime, that the Scots have a proverb, when they hear an unuſual expreſſion, that, *There is nae ſic a word in a' Davie Lindſay.* Mackenzie tells us, that his comedies were ſo facetious, that they afforded abundance of mirth. Some fragments of theſe comedies are ſtill preſerved in manuſcript. He is ſaid to have alſo written ſeveral tragedies, and to have firſt introduced dramatic poetry into Scotland. One of his comedies was played in 1515. Mackenzie ſays, he underſtood nothing of the rules of the theatre. He was cotemporary with John Heywood, the firſt Engliſh dramatic poet. His poems are printed in one ſmall volume; and fragments of his plays, in manuſcript, are in Mr William Carmichael's collection.

LINDSEY, the third and largeſt diviſion of the county of Lincolnſhire in England. On the eaſt and north it is waſhed by the ſea, into which it runs out with a large front; on the weſt it has Yorkſhire and Nottinghamſhire, from which it is parted by the rivers Trent and Dun; on the ſouth it has Keſtevan, from which it is ſeparated by the river Witham and the Foſs-dyke, which is ſeven miles long, and was cut by Henry I. between the Witham and the Trent, for the convenience of carriage in thoſe parts. It had its name from Lincoln, the capital of the county, which ſtands in it, and by the Romans called *Lindum*, by the Britons *Lindcoite*, by the Saxons *Lindo-collyne*, probably from its ſituation on a hill, and the lakes or woods that were anciently thereabouts; but the Normans called it *Nichol.* It gives title of earl and marquis to the duke of Ancaſter.

LINDUS, in *Ancient Geography*, a town of Rhodes, ſituated on a hill on the weſt ſide of the iſland. It was built by Tlepolemus the ſon of Hercules, according to Diodorus Siculus; by one of the Heliades, grandſons of the Sun, named *Lindus*, according to Strabo. It was the native place of Cleobulus, one of the wiſe men. Here we ſee the famous temple of the Lindian Minerva, which was built by the daughters of Danaus. Cadmus enriched this temple with many ſplendid offerings. The citizens dedicated and hung up here the ſeventh of Pindar's Olympic odes, written in letters of gold. The ruins of that ſuperb edifice are ſtill to be ſeen on the top of a high hill which overlooks the ſea. Some remains of the walls, conſiſting of ſtones of an enormous ſize, ſtill ſhow it to have been built in the Egyptian ſtyle. The pillars and other ornaments have been carried off. On the moſt elevated peak of the rock are the ruins of a caſtle, which may have ſerved as a fortreſs to the city. Its circumference is very extenſive, and is filled with rabbits.

Lindo, the modern city, ſtands at the foot of the hill. A bay of conſiderable wideneſs and depth ſerves as a harbour to the city. Ships find good anchorage there in twenty fathoms water. They are ſafely ſheltered from the ſouth-weſt winds, which conſtantly prevail through the ſevereſt ſeaſon of the year. In the beginning of winter, they caſt anchor off a ſmall village named Maſſary. Before the building of Rhodes, Lindus was the harbour which received the fleets of Egypt and Tyre. It was enriched by commerce. Mr Savary obſerves, that a judicious government, by taking advantage of its harbour and happy ſituation, might yet reſtore it to a flouriſhing ſtate.

LINE, in *Geometry*, a quantity extended in length only, without any breadth or thickneſs. It is formed by the flux, or motion of a point. See FLUXIONS, and GEOMETRY.

LINE, in the art of war, is underſtood of the diſpoſition of an army ranged in order of battle, with the front extended as far as may be, that it may not be flanked.

LINE of Battle, is alſo underſtood of a diſpoſition of the fleet in the day of engagement; on which occaſion the veſſels are uſually drawn up as much as poſſible in a ſtraight line, as well to gain and keep the advantage of the wind as to run the ſame board. See *Naval TACTICS*.

Horizontal LINE, in *Geography* and *Aſtronomy*, a line drawn parallel to the horizon of any part of the earth.

Equinoctial LINE, in *Geography*, is a great circle on the earth's ſurface, exactly at the diſtance of 90° from each of the poles, and of conſequence biſecting the earth in that part. From this imaginary line, the degrees of longitude and latitude are counted.—In aſtronomy, the equinoctial line is that circle which the ſun ſeems to deſcribe round the earth on the days of the equinox in March and September. See ASTRONOMY and GEOGRAPHY.

Meridian LINE, is an imaginary circle drawn through the two poles of the earth and any part of its ſurface. See GEOGRAPHY *Index*.

Ship of the LINE, a veſſel large enough to be drawn up in the line, and to have a place in a ſea-fight.

LINE, in *Genealogy*, a ſeries or ſucceſſion of relations in various degrees, all deſcending from the ſame common father. See DESCENT.

LINE, alſo denotes a French meaſure containing the 12th part of an inch, or the 144th part of a foot. Geometricians conceive the line ſubdivided into ſix points. The French line anſwers to the Engliſh barley-corn.

Fiſhing LINE. See *FISHING Line*.

LINES, in *Heraldry*, the figures uſed in armories to divide the ſhield into different parts, and to compoſe different figures. Theſe lines, according to their different forms and names, give denomination to the pieces or figures which they form, except the ſtraight or plain lines. See HERALDRY.

LINEA ALBA, in *Anatomy*, the concourſe of the tendons of the oblique and tranſverſe muſcles of the abdomen; dividing the abdomen in two, in the middle. It is called *linea*, line, as being ſtraight; and *alba*, from its colour, which is white.—The *linea alba* receives a twig of a nerve from the intercoſtals in each of its digitations or indentings, which are viſible to the eye, in lean perſons eſpecially.

LINEAMENT, among painters, is uſed for the outlines of a face.

LINEAR NUMBERS, in *Mathematics*, ſuch as have relation to length only; ſuch is a number which repreſents one ſide of a plain figure. If the plain figure be a ſquare, the linear figure is called a *root*.

LINEAR Problem; that which may be ſolved geometrically by the interſection of two right lines. This is called a *ſimple problem*, and is capable but of one ſolution.

LINEN, in commerce, a well known kind of cloth, chiefly made of flax.—Linen was not worn by the Jews, Greeks, or Romans, as any part of their ordinary dreſs. Under-tunics of a finer texture ſupplied the place of ſhirts: Hence the occaſion for frequent bathing. Alexander Severus was the firſt emperor who wore a ſhirt: but the uſe of ſo neceſſary a garment did not become common till long after him.

The linen manufacture was probably introduced into Britain with the firſt ſettlements of the Romans. The flax was certainly firſt planted by that nation in the Britiſh ſoil. The plant itſelf indeed appears to have been originally a native of the eaſt. The woollen-drapery would naturally be prior in its origin to the linen; and the fibrous plants from which the threads of the latter are produced, ſeem to have been firſt noticed and worked by the inhabitants of Egypt. In Egypt, indeed, the linen manufacture appears to have been very early: for even in Joſeph's time it had riſen to a conſiderable height. From the Egyptians the knowledge of it proceeded probably to the Greeks, and from them to the Romans. Even at this day the flax is imported among us from the eaſtern nations; the weſtern kind being merely a degenerate ſpecies of it.

In order to ſucceed in the linen manufacture, one ſet of people ſhould be confined to the ploughing and preparing the ſoil, ſowing and covering the ſeed, to the weeding, pulling, rippling, and taking care of the new ſeed, and watering and dreſſing the flax till it is lodged at home: others ſhould be concerned in the drying, breaking, ſcutching, and heckling the flax, to fit it for the ſpinners; and others in ſpinning and reeling it, to fit it for the weaver: others ſhould be concerned in taking due care of the weaving, bleaching, beetling, and finiſhing the cloth for the market. It is reaſonable to believe, that if theſe ſeveral branches of the manufacture were carried on by diſtinct dealers in Scotland and Ireland, where our home-made linens are manufactured, the ſeveral parts would be better executed, and the whole would be afforded cheaper, and with greater profit.

Staining of LINEN. Linen receives a black colour with much more difficulty than woollen or cotton. The black ſtruck on linen with common vitriol and galls, or logwood, is very periſhable, and ſoon waſhes out.—Inſtead of the vitriol, a ſolution of iron in four ſtrong beer is to be made uſe of. This is well known to all the calico-printers; and by the uſe of this, which they call their *iron-liquor*, and madder root, are the blacks and purples made which we ſee on the common printed linens.

The method of making this iron-liquor is as follows: A quantity of iron is put into the ſour ſtrong beer; and, to promote the diſſolution of the metal, the whole is occaſionally well ſtirred, the liquor occaſionally drawn off, and the ruſt beat from the iron, after which the liquor is poured on again. A length of time is required to make the impregnation perfect; the ſolution being reckoned unfit for uſe till it has ſtood at leaſt a twelvemonth. This ſolution ſtains the linen of a yellow, and different ſhades of buff-colour; and is the only known ſubſtance by which theſe colours can be fixed on linen. The cloth ſtained deep with the iron-liquor, and afterwards boiled with madder, without any other addition, becomes of the dark colour which we ſee on printed linens and cottons; which, if not a perfect black, has a very near reſemblance to it. Others are ſtained paler with the ſame liquor diluted with water, and come out purple.

Linen may alſo be ſtained of a durable purple by means of ſolution of gold in aqua regia. The ſolution for this purpoſe ſhould be as fully ſaturated as poſſible; it ſhould be diluted with three times its quantity of water; and if the colour is required deep, the piece, when dry, muſt be repeatedly moiſtened with it. The colour does not take place till a conſiderable time, ſometimes ſeveral days, after the liquor has been applied: to haſten its appearance, the ſubject ſhould be expoſed to the ſun and free air, and occaſionally removed to a moiſt place, or moiſtened with water.—When ſolution of gold in aqua regia is ſoaked up in linen cloths, the metal may be recovered by drying and burning them.

Linen flowered with Gold-leaf. Dr Lewis mentions a manufacture eſtabliſhed in London for embelliſhing linen with flowers and ornaments of gold-leaf. The linen, he ſays, looks whiter than moſt of the printed linens; the gold is extremely beautiful, and bears waſhing well. The doctor informs us, that he had ſeen a piece which he was credibly informed had been waſhed three or four times, with only the ſame precautions which are uſed for the finer printed linens; and on which the gold continued entire, and of great beauty. Concerning the proceſs uſed in this manufacture, he gives us no particulars.

Foſſile Linen, is a kind of amianthus, which conſiſts of flexible, parallel, ſoft fibres, and which has been celebrated for the uſes to which it has been applied, of being woven, and forming an *incombuſtible cloth*. Paper alſo, and wicks for lamps, have been made of it. See Amianthus, Asbestos, and Mineralogy *Index*.

LING, a ſpecies of fiſh belonging to the genus Gadus, which ſee in Ichthyology *Index*.

LINGEN, a ſtrong town of Germany, in the circle of Weſtphalia, and capital of a county of the ſame name. It belongs to the king of Pruſſia; and is ſituated on the river Embs, in E. Long. 7. 30. N. Lat. 52. 32.

LINIMENT, in *Pharmacy*, a compoſition of a conſiſtence ſomewhat thinner than an unguent, and thicker than an oil. See Materia Medica *Index*.

LINLITHGOW, the chief town of Weſt Lothian in Scotland. It is ſuppoſed to be the *Lindum* of Ptolemy; and to take its name from its ſituation on a lake, which the word *Lin* or *Llyn* ſignifies.—It is diſtant 16 miles from Edinburgh, and is a royal borough and ſeat of a preſbytery. Here is carried on a conſiderable trade in dreſſing of white leather, which is ſent abroad to be manufactured; and many hands are employed in dreſſing of flax; alſo in wool-combing, the wool for which is brought from the borders. Its port was formerly *Blackneſs*; but ſince the decline of that place, *Borrowſtounneſs*, about two miles diſtant from Linlithgow. The town conſiſts of one open ſtreet, from whence lanes are detached on both ſides; the houſes are built of ſtone, tolerably neat and commodious; and the place is adorned with ſome ſtately public edifices. The palace, built, as Sibbald ſuppoſed, on the ſeat of a Roman ſtation, forms a ſquare with towers at the corners, and ſtands on a gentle eminence, with the beautiful loch behind it to the weſt. It was one of the nobleſt of the royal reſidences; and was greatly ornamented by James V. and VI. Within the palace is a handſome ſquare; one ſide of which is more modern than the others, having been built by James VI. and kept in good repair till 1746, when it was accidentally damaged by the king's forces making fires on the hearths, by which means the joiſts were burnt. A ſtone ornamented fountain in the middle of the court was deſtroyed at the ſame time. The other ſides of the ſquare are more ancient. In one is a room ninety five feet long, thirty feet ſix inches wide, and thirty-three high. At one end is a gallery with three arches, perhaps for muſic. Narrow galleries run quite round the old part, to preſerve communication with the rooms; in one of which the unfortunate Mary Stuart firſt ſaw light. On the north ſide of the high ſtreet, on an eminence eaſt of the palace, ſtands St Michael's church; a handſome ſtructure, where James V. intended to have erected a throne and twelve ſtalls for the ſovereign and knights of the order of St Andrew. In the market-place is another fountain of two ſtories with eight ſpouts, and ſurmounted like the former with an imperial crown. In one of the ſtreets is ſhown the gallery where the regent Murray was ſhot. Here was a houſe of Carmelites, founded by the townſpeople in 1290, deſtroyed by the Reformers 1559. The family of Livingſton, who took the title of earl from this place, were hereditary keepers of this palace, as alſo bailiffs of the king's bailifry, and conſtables of Blackneſs caſtle; but by their concern in the rebellion of 1715 all theſe honours with their eſtate were forfeited to the crown. Sir James Livingſton, ſon of the firſt earl by marriage with a daughter of Callendar, was created earl of Callendar by Charles I. 1641, which title ſunk into the other.

LINLITHGOWSHIRE, or West Lothian, nearly approaches in form to a parallelogram, about 20 miles long from eaſt to weſt, and from 10 to 13 broad, from north to ſouth. It is bounded by the river Forth on the north; by the river Amond on the ſouth-eaſt; by Lanarkſhire on the ſouth-weſt; and by the river Avon on the weſt. It is allowed to be one of the richeſt counties in Scotland, the ſoil in general being a rich loam, in a high ſtate of cultivation and improvement. Its ſurface is diverſified by gentle ſwells and fertile plains; and the number of elegant ſeats almoſt everywhere to be met with, gives it both a rich and delightful appearance. The whole is a compoſition of all that is great and beautiful; towns, villages, ſeats, and ancient towers, decorate each bank of that fine expanſe of water, the frith of Forth. The lofty moun-

Linlithgowſhire, Linnæus.

tains of the Highlands form a diſtant, but auguſt boundary towards the north-weſt; and the eaſtern view is enlivened with ſhips perpetually appearing or vaniſhing, amidſt the numerous iſlands. Hopetoun-houſe, Barnbougle-caſtle, Calder-houſe, Craigie-hall, and the ſeat of General Dundas, are ſome of the principal ornaments of this county. It contains two royal boroughs, Linlithgow and Queensferry, beſides the towns of Borrowſtounneſs, Bathgate, and Kirkliſtoun. It is poorly ſupplied with running water, the Avon and Amond being the only ſtreams which are deſerving of notice. There are many valuable minerals found in it in abundance, ſuch as coal, limeſtone, and ſome lead ore. In the reign of James VI. a vein of lead was diſcovered, ſo rich in ſilver, that it was thought worthy of being wrought for the ſake of that metal alone. Almoſt every pariſh abounds with ironſtone, which is extenſively wrought in the pariſh of Bathgate. In many places there are appearances of whinſtone or baſalt, particularly at Dundas-hill, in the pariſh of Dalmeny, where there is a ſolid front of baſaltic rock, exhibiting in ſome places regular columns. The population of this county in 1801 amounted to 17,844. The following is the population of the pariſhes according to the Statiſtical Hiſtory.

	Pariſhes.		Population in 1755	Population in 1790—1798.
1	Abercorn	-	1037	870
	Bathgate	-	1594	2309
	Borrowſtounneſs	-	2668	3178
	Carriden	-	1164	1450
5	Dalmeny	-	1103	907
	Eccleſmachan	-	351	215
	Kirkliſtoun	-	1461	1504
	Linlithgow	-	3296	3221
	Livingſtone	-	598	420
10	Queensferry	-	451	505
	Torphichen	-	1295	1069
	Uphall	-	690	600
13	Whitburn	-	1121	1322
			16,829	17,570
				16,829
				Increaſe, 741

LINNÆUS, Sir Charles, a celebrated botaniſt and natural hiſtorian, was born on May 24. 1707, in a village called *Roeſhult* in Smaland, where his father, Nicholas Linnæus, was then vicar, but afterwards preferred to the curacy of Stenbrohult. We are told, that on the farm where Linnæus was born, there yet ſtands a large lime tree, from which his anceſtors took the ſurnames of *Tiliander*, *Lindelius*, and *Linnæus*; and that this origin of ſurnames, taken from natural objects, is not uncommon in Sweden.

This eminent man, whoſe talents enabled him to reform the whole ſcience of natural hiſtory, accumulated, very early in life, ſome of the higheſt honours that await the moſt ſucceſsful proficients in medical ſcience; ſince we find that he was made profeſſor of phyſic and botany, in the univerſity of Upſal, at the age of 34; and ſix years afterwards, phyſician to Adolphus king of Sweden; who in the year 1753 honoured him ſtill farther, by creating him knight of the order of the Polar Star. His honours did not terminate here: for in 1757 he was ennobled; and in 1776 the king of Sweden accepted the reſignation of his office, and rewarded his declining years by doubling his penſion, and by a liberal donation of landed property ſettled on him and his family.

Linnæus.

From Dr Pulteney's General View of the Life and Writings of Linnæus.

It ſeems probable, that Linnæus's taſte for the ſtudy of nature was caught from the example of his father; who, as he has himſelf informed us, cultivated, as his firſt amuſement, a garden plentifully ſtored with plants. Young Linnæus ſoon became acquainted with theſe, as well as with the indigenous ones of his neighbourhood. Yet, from the ſtraitneſs of his father's income, our young naturaliſt was on the point of being deſtined to a mechanical employment; fortunately, however, this deſign was over-ruled. In 1717 he was ſent to ſchool at Wexſio; where, as his opportunities were enlarged, his progreſs in all his favourite purſuits was proportionably extended. At this early period he paid attention to other branches of natural hiſtory, particularly to the knowledge of inſects.

The firſt part of his academical education Linnæus received under Profeſſor Stobæus, at Lund, in Scania, who favoured his inclinations to the ſtudy of natural hiſtory. After a reſidence of about a year, he removed in 1728 to Upſal. Here he ſoon contracted a cloſe friendſhip with Artedi, a native of the province of Angermania, who had already been four years a ſtudent in that univerſity, and, like himſelf, had a ſtrong bent to the ſtudy of natural hiſtory in general, but particularly to ichthyology. Soon after his reſidence at Upſal, our author was alſo happy enough to obtain the favour of ſeveral gentlemen of eſtabliſhed character in literature. He was in a particular manner encouraged in the purſuit of his ſtudies by the patronage of Dr Olaus Celſius, at that time profeſſor of divinity, and the reſtorer of natural hiſtory in Sweden; who, being ſtruck with the diligence of Linnæus in deſcribing the plants of the Upſal garden, and his extenſive knowledge of their names, not only patronized him in a general way, but admitted him to his houſe, his table, and his library. Under ſuch encouragement it is not ſtrange that our author made a rapid progreſs, both in his ſtudies and the eſteem of the profeſſors: in fact, we have a very ſtriking proof of his merit and attainments; ſince we find, that, after only two years reſidence, he was thought ſufficiently qualified to give lectures occaſionally from the botanic chair, in the room of Profeſſor Rudbeck.

In the year 1731, the Royal Academy of Sciences at Upſal having for ſome time meditated the deſign of improving the natural hiſtory of Sweden, at the inſtance particularly of Profeſſors Celſius and Rudbeck, deputed Linnæus to make the tour of Lapland, with the ſole view of exploring the natural hiſtory of that arctic region; to which undertaking, his reputation, already high as a naturaliſt, and the ſtrength of his conſtitution, equally recommended him. He left Upſal the 13th of May, and took his route to Gevalia or Gevels, the principal town of Geſtricia, 45 miles diſtant from Upſal. Hence he travelled through Helſingland into Medalpadia, where he made an excurſion, and aſcended a remarkable mountain, before he reached Hudwickſwald, the chief town of Helſingland. From hence he went through Angermanland to Hernoſand,

noſand, a ſea-port on the Bothnic gulf, 70 miles diſtant from Hudwickſwald. When he had proceeded thus far, he found it proper to retard his journey, as the ſpring was not ſufficiently advanced; and took this opportunity of viſiting thoſe remarkable caverns on the ſummit of Mount Skula, though at the hazard of his life.

When Linnæus arrived at Uma, in Weſt Bothnia, about 96 miles from Hernoſand, he quitted the public road, and took his courſe through the woods weſtward, in order firſt to traverſe the moſt ſouthern parts of Lapland. Being now come to the country that was more particularly the object of his inquiries, equally a ſtranger to the language and to the manners of the people, and without any aſſociate, he committed himſelf to the hoſpitality of the inhabitants, and never failed to experience it fully. He ſpeaks in ſeveral places, with peculiar ſatisfaction, of the innocence and ſimplicity of their lives, and their freedom from diſeaſes. In this excurſion he reached the mountains towards Norway; and, after encountering great hardſhips, returned into Weſt Bothnia, quite exhauſted with fatigue. Our traveller next viſited Pitha and Lula, upon the gulf of Bothnia; from which latter place he took again a weſtern route, by proceeding up the river of that name, and viſited the ruins of the temple of Jockmock in Lula Lapland or Lap Mark: thence he traverſed what is called the *Lapland Deſert*, deſtitute of all villages, cultivation, roads, or any conveniences; inhabited only by a few ſtraggling people, originally deſcended from the Finlanders, and who ſettled in this country in remote ages, being entirely a diſtinct people from the Laplanders. In this diſtrict he aſcended a noted mountain called *Wallevari;* in ſpeaking of which he has given us a pleaſant relation of his finding a ſingular and beautiful new plant (*Andromeda tetragona*) when travelling within the arctic circle, with the ſun in his view at midnight, in ſearch of a Lapland hut. From hence he croſſed the Lapland Alps into Finmark, and traverſed the ſhores of the North ſea as far as Sallero.

Theſe journeys from Lula and Pitha on the Bothnian gulf, to the north ſhore, were made on foot; and our traveller was attended by two Laplanders, one his interpreter, and the other his guide. He tells us, that the vigour and ſtrength of theſe two men, both old, and ſufficiently loaded with his baggage, excited his admiration; ſince they appeared quite unhurt by their labour, while he himſelf, although young and robuſt, was frequently quite exhauſted. In this journey he was wont to ſleep under the boat with which they forded the rivers, as a defence againſt rain, and the gnats, which in the Lapland ſummer are not leſs teaſing than in the torrid zones. In deſcending one of theſe rivers, he narrowly eſcaped periſhing by the overſetting of the boat, and loſt many of the natural productions which he had collected.

Linnæus thus ſpent the greater part of the ſummer in examining this arctic region, and thoſe mountains on which, four years afterwards, the French philoſophers ſecured immortal fame to Sir Iſaac Newton. At length, after having ſuffered incredible fatigues and hardſhips, in climbing precipices, paſſing rivers in miſerable boats, ſuffering repeated viciſſitudes of extreme heat and cold, and not unfrequently hunger and thirſt, he returned to Tornea in September. He did not take the ſame route from Tornea as when he came into Lapland, having determined to viſit and examine the country on the eaſtern ſide of the Bothnian gulf: his firſt ſtage, therefore, was to Ula in Eaſt Bothnia; from thence to Old and New Carleby, 84 miles ſouth from Ula. He continued his route through Waſa, Chriſtianſtadt, and Biorneburgh, to Abo, a ſmall univerſity in Finland. Winter was now ſetting in apace; he therefore croſſed the gulf by the iſland of Aland, and arrived at Upſal in November, after having performed, and that moſtly on foot, a journey of ten degrees of latitude in extent, excluſively of thoſe deviations which ſuch a deſign rendered neceſſary.

In 1733 he viſited and examined the ſeveral mines in Sweden; and made himſelf ſo well acquainted with mineralogy and the docimaſtic art, that we find he was ſufficiently qualified to give lectures on thoſe ſubjects upon his return to the univerſity. The outlines of his ſyſtem on mineralogy appeared in the early editions of the *Syſtema Naturæ;* but he did not exemplify the whole until the year 1768.

In the year 1734 Linnæus was ſent by Baron Reuterholm, governor of Dalecaria, with ſeveral other naturaliſts in that province, to inveſtigate the natural productions of that part of the Swediſh dominions; and it was in this journey that our author firſt laid the plan of an excellent inſtitution, which was afterwards executed, in a certain degree at leaſt, by himſelf, with the aſſiſtance of many of his pupils, and the reſult publiſhed under the title of *Pan Suecicus*, in the ſecond volume of the *Amœnitates Academicæ*.

After the completion of this expedition, it appears that Linnæus reſided for a time at Fahlun, the principal town in Dalecarlia; where he tells us, that he taught mineralogy and the docimaſtic art, and practiſed phyſic; and where he was very hoſpitably treated by Dr More, the phyſician of the place. It alſo appears, that he contracted at this time an intimacy with one of that gentleman's daughters, whom he married about five years afterwards upon his ſettling as a phyſician at Stockholm.—In this journey he extended his travels quite acroſs the Dalecarlian Alps into Norway; but we have no particular account of his diſcoveries in that kingdom. In 1735 Linnæus travelled over many other parts of Sweden, ſome parts of Denmark and Germany, and fixed in Holland, where he chiefly reſided until his return to Stockholm, about the year 1739. In 1735, the year in which he took the degree of M. D. he publiſhed the firſt ſketch of his *Syſtema Naturæ*, in a very compendious way, and in the form of tables only, in 12 pages in folio. By this it appears that he had at a very early period of his life (certainly before he was 24 years old), laid the baſis of that great ſtructure which he afterwards raiſed, not only to the increaſe of his own fame, but to that of natural ſcience.

In 1736, Linnæus came into England, and viſited Dr Dillenius, the late learned profeſſor at Oxford, whom he juſtly conſidered as one of the firſt botaniſts in Europe. He mentions with particular reſpect the civilities he received from him, and the privileges he gave him of inſpecting his own and the Sherardian collections of plants. It is needleſs to ſay, that he viſited Dr Martyn, Mr Rand, and Mr Miller, and that he was in a more ſingular manner indebted to the friendſhip of Dr Iſaac Lawſon. He alſo contracted an intimate friendſhip with Mr Peter Collinſon, which was reciprocally increaſed by a multitude of good offices, and continued to the laſt without any diminution. Dr Boerhaave had furniſhed him with letters to our great naturaliſt Sir Hans Sloane; but, it is with regret that we muſt obſerve, they did not procure him the reception which the warmth of his recommendation ſeemed to claim.

One of the moſt agreeable circumſtances that happened to Linnæus during his reſidence in Holland, aroſe from the patronage of Mr Clifford, in whoſe houſe he lived a conſiderable part of his time, being now as it were the child of fortune:—*Exivi patriâ triginta ſex nummis aureis dives*—are his own words. With Mr Clifford, however, he enjoyed pleaſures and privileges ſcarcely at that time to be met with elſewhere in the world; that of a garden excellently ſtored with the fineſt exotics, and a library furniſhed with almoſt every botanic author of note. How happy he found himſelf in this ſituation, thoſe only who have felt the ſame kind of ardour can conceive. Whilſt in Holland, our author was recommended by Boerhaave to fill the place then vacant, of phyſician to the Dutch ſettlement at Surinam; but he declined it on account of his having been educated in ſo oppoſite a climate.

Beſides being favoured with the particular patronage and friendſhip of Boerhaave and Mr Clifford, as is above mentioned, our author had alſo the pleaſure of being contemporary with, and of reckoning among the number of his friends, many other learned perſons who have ſince proved ornaments to their profeſſion, and whoſe merit has moſt deſervedly raiſed them to fame and honour. Among theſe we may properly mention Dr John Burman, profeſſor of botany at Amſterdam, whoſe name and family are well known in the republic of letters, and to whom our author dedicated his *Bibliotheca Botanica*, having been greatly aſſiſted in compiling that work by the free acceſs he had to that gentleman's excellent library; John Frederick Gronovius of Leyden, editor of Clayton's *Flora Virginica*, and who very early adopted Linnæus's ſyſtem; Baron Van Swieten, phyſician to the empreſs queen; Iſaac Lawſon, before mentioned, afterwards one of the phyſicians to the Britiſh army, who died much regretted at Ooſterhout in the year 1747, and from whom Linnæus received ſingular and very important civilities; Kramer, ſince well known for an excellent treatiſe on the docimaſtic art; Van Royen, botanic profeſſor at Leyden; Liëberkun of Berlin, famous for his ſkill in microſcopical inſtruments and experiments. To theſe may be added alſo the names of Albinus and Gaubius, and of others, were it requiſite to ſhow that our author's talents had very early render him conſpicuous, and gained him the regard of all thoſe who cultivated and patroniſed any branch of medical ſcience; and to which, doubtleſs, the ſingular notice with which Boerhaave honoured him did not a little contribute.

Early in the year 1738, after Linnæus had left Mr Clifford, and, as it ſhould ſeem, when he reſided with Van Royen, he had a long and dangerous fit of ſickneſs; and upon his recovery went to Paris, where he was properly entertained by the Juſſieus; at that time the firſt botaniſts in France. The opportunity this gave him of inſpecting the Herbaria of Royen and Tournefort, and thoſe of the above-named gentlemen, afforded him great ſatisfaction. He had intended to have gone from thence into Germany, to viſit Ludwig and the celebrated Haller, with whom he was in cloſe correſpondence; but he was not able to complete this part of his intended route, and was obliged to return without this gratification.

Our author did not fail to avail himſelf of every advantage that acceſs to the ſeveral muſeums of this country afforded him, in every branch of natural hiſtory; and the number and importance of his publications, during his abſence from his native country, ſufficiently demonſtrate that fund of knowledge which he muſt have imbibed before, and no leſs teſtify his extraordinary application. Theſe were *Syſtema Naturæ*, *Fundamenta Botanica*, *Bibliotheca Botanica*, and *Genera Plantarum*; the laſt of which is juſtly conſidered as the moſt valuable of all the works of this celebrated author. What immenſe application had been beſtowed upon it, the reader may eaſily conceive, on being informed, that before the publication of the firſt edition the author had examined the characters of 8000 flowers. The laſt book of Linnæus's compoſition, publiſhed during his ſtay in Holland, was the *Claſſes Plantarum*, which is a copious illuſtration of the ſecond part of the *Fundamenta*.

About the latter end of the year 1738, or the beginning of the next, our author ſettled as a phyſician at Stockholm; where he ſeems to have met with conſiderable oppoſition, and was oppreſſed with many difficulties; but all of theſe at length he overcame, and got into extenſive practice; and ſoon after his ſettlement married the lady before ſpoken of. By the intereſt of Count Teſſin, who was afterwards his great patron, and even procured medals to be ſtruck in honour of him, he obtained the rank of phyſician to the fleet, and a ſtipend from the citizens for giving lectures in botany. And what at this time eſpecially was highly favourable to the advancement of his character and fame, by giving him an opportunity of diſplaying his abilities, was the eſtabliſhment of the Royal Academy of Sciences at Stockholm; of which Linnæus was conſtituted the firſt preſident, and to which eſtabliſhment the king granted ſeveral privileges, particularly that of free poſtage to all papers directed to the ſecretary. By the rules of the academy, the preſident held his place but three months. At the expiration of that term, Linnæus made his *Oratio de memorabilibus in Inſectis*, Oct. 3. 1739; in which he endeavours to excite an attention and inquiry into the knowledge of inſects, by diſplaying the many ſingular phenomena that occur in contemplating the nature of thoſe animals, and by pointing out, in a variety of inſtances, their uſefulneſs to mankind in particular, and to the economy of nature in general.

During all this time, however, Linnæus appears to have had his eye upon the botanic and medical chair at Upſal, at this time occupied by Rudbeck, who was far advanced in life. We learn indeed that he was ſo intent on purſuing and perfecting his great deſigns in the advancement of his favourite ſtudy of nature, that he had determined, if he failed in procuring the profeſſorſhip at Upſal, to accept the offer that had been made to him by Haller of filling the botanic chair at Gottingen. However, in courſe of time, he obtained his wiſh. In the year 1741, upon the reſignation of Roberg, he was conſtituted joint profeſſor of phyſic, and phyſician to the king, with Roſen, who had been appointed in the preceding year on the death of Rudbeck. Theſe two colleagues agreed to divide the medical departments between them; and their choice was confirmed by the univerſity. Roſen took anatomy, phyſiology, pathology, and the therapeutic part; Linnæus, natural hiſtory, botany, materia medica, the dietetic part, and the diagnoſis morborum.

During the interval of his removal from Stockholm to Upſal in conſequence of this appointment, our profeſſor was deputed by the ſtates of the kingdom to make a tour to the iſlands of Oëland and Gothland in the Baltic, attended by ſix of the pupils, commiſſioned to make ſuch inquiries as might tend to improve agriculture and arts in the kingdom, to which the Swediſh nation had for ſome time paid a particular attention. The reſult of this journey was very ſucceſsful, and proved fully ſatisfactory to the ſtates, and was afterwards communicated to the public. On his return he entered upon the profeſſorſhip, and pronounced before the univerſity his oration *de Peregrinationum intra Patriam neceſſitate*, October 17. 1741; in which he forcibly diſplays the uſefulneſs of ſuch excurſions, by pointing out to the ſtudents that vaſt field of objects which their country held out to their cultivation, whether in geography, phyſics, mineralogy, botany, zoology, or economics, and by ſhowing the benefit that muſt accrue to themſelves and their country as rewards to their diligence. That animated ſpirit which runs through the whole of this compoſition, renders it one of the moſt pleaſing and inſtructive of all our author's productions.

Linnæus was now fixed in the ſituation that was the beſt adapted to his character, his taſte, and abilities; and which ſeems to have been the object of his ambition and centre of his hopes. Soon after his eſtabliſhment, he laboured to get the academical garden, which had been founded in 1657, put on a better footing and very ſoon effected it; procuring alſo a houſe to be built for the reſidence of the profeſſor. The whole had been in ruins ever ſince the fire in 1702; and at the time Linnæus was appointed profeſſor of botany, the garden did not contain above fifty plants that were exotic. His correſpondence with the firſt botaniſts in Europe ſoon ſupplied him with great variety. He received Indian plants from Juſſieu of Paris, and from Van Royen of Leyden; European plants from Haller and Ludwig; American plants from the late Mr Collinſon, Mr Cateſby, and others; and variety of annuals from Dillenius: in ſhort, how much the garden owed to his diligence and care in a few years, may be ſeen by the catalogue publiſhed under the title of *Hortus Upſalienſis, exhibens Plantas exoticas horto Upſalienſis Academiæ à ſeſe (Linnæo) illatas ab anno* 1742, *in annum* 1748, *additis differentiis ſynonymis, habitationibus, hoſpitiis, rariorumque deſcriptionibus, in gratiam ſtudioſæ juventutis*; Holm. 1748, 8vo. pp. 306. tab. 3. By this catalogue it appears, that the profeſſor had introduced 1100 ſpecies, excluſively of all the Swediſh plants and of varieties: which latter, in ordinary gardens, amount not unfrequently to one-third of the whole number. The preface contains a curious hiſtory of the climate at Upſal, and the progreſs of the ſeaſons throughout the whole year.

From the time that Linnæus and Roſen were appointed profeſſors at Upſal, it ſhould ſeem that the credit of that univerſity, as a ſchool of phyſic, had been increaſing: numbers of ſtudents reſorted thither from Germany, attracted by the character of theſe two able men; and in Sweden itſelf many young men were invited to the ſtudy of phyſic by the excellent manner in which it was taught, who otherwiſe would have engaged in different purſuits.

Whilſt Linnæus was meditating one of his capital performances, which had long been expected and greatly wiſhed for, he was interrupted by a tedious and painful fit of the gout, which left him in a very weak and diſpirited ſtate; and, according to the intelligence that his friends gave of him, nothing was thought to have contributed more to the reſtoration of his ſpirits than the ſeaſonable acquiſition, at this juncture, of a collection of rare and undeſcribed plants.

The fame which our author had now acquired by his *Syſtema Naturæ*, of which a ſixth edition, much enlarged, had been publiſhed at Stockholm in 1748 in 8vo, pp. 232, with eight tables explanatory of the claſſes and orders (and which was alſo republiſhed by Gronovius at Leyden), had brought, as it were, a conflux of every thing rare and valuable in every branch of nature, from all parts of the globe, into Sweden. The king and queen of Sweden had their ſeparate collections of rarities; the former at Ulrickſdahl; the latter, very rich in exotic inſects and ſhells, procured at a great expence, at the palace of Drottningholm: both of which our author was employed in arranging and deſcribing. Beſides theſe, the muſeum of the Royal Academy of Upſal had been augmented by a conſiderable donation from the king, whilſt hereditary prince, in 1746; by another from Count Gyllenborg the year before; by a third from M. Grill, an opulent citizen of Stockholm.

From this time we ſee the profeſſor in a more elevated rank and ſituation in life. His reputation had already procured him honours from almoſt all the royal ſocieties in Europe; and his own ſovereign, truly ſenſible of his merit, and greatly eſteeming his character and abilities, favoured him with a mark of his diſtinction and regard, by creating him a knight of the Polar Star. It was no longer *laudatur et alget*. His emoluments kept pace with his fame and honours: his practice in his profeſſion became lucrative; and we find him ſoon after poſſeſſed of his country houſe and gardens at Hammarby, about five miles from Upſal. He had moreover received one of the moſt flattering teſtimonies of the extent and magnitude of his fame that perhaps was ever ſhown to any literary character, the ſtate of the nation which conferred it, with all its circumſtances, duly conſidered. This was an invitation to Madrid from the king of Spain, there to preſide as a naturaliſt, with the offer of an annual penſion for life of 2000 piſtoles, letters of nobility, and the perfect free exerciſe of his own religion: But, after the moſt perfect acknowledgements of the ſingular honour done him, he returned for anſwer, ture: if he had any merits, they were due to his own country.'

In the year 1755, the Royal Academy of Sciences at Stockholm honoured our profeſſor with one of the firſt premiums, agreeably to the will of Count Sparree, who had decreed two gold medals, of ten ducats value each, to be annually given by the academy to the authors of ſuch papers, in the preceding year's Stockholm Acts, as ſhould be adjudged moſt uſeful in promoting agriculture particularly, and all branches of rural economy. This medal bore on one ſide the arms of the count, with this motto, *Superſtes in ſcientiis amor Frederici Sparree.* Linnæus obtained it in conſequence of a paper *De Plantis quæ Alpium Suecicarum indigenæ, magno rei œconomicæ et medicæ emolumento fieri poſſint*; and the ultimate intention was to recommend theſe plants as adapted to culture in Lapland. This paper was inſerted in the Stockholm Acts for 1754, vol. xv. Linnæus alſo obtained the *præmium centum aureorum*, propoſed by the Imperial Academy of Sciences at Peterſburgh, for the beſt paper written to eſtabliſh or diſprove, by new arguments, the doctrine of the ſexes of plants. It was, if poſſible, an additional glory to Linnæus to have merited this premium from the Peterſburgh academy; inaſmuch as a profeſſor of that ſociety, a few years before, had with more than common zeal, although with a futility like that of the other antagoniſts of our author, endeavoured to overturn the whole Linnæan ſyſtem of botany, by attempting to ſhow that the doctrine of the ſexes of plants had no foundation in nature, and was unſupported by facts and experiments.

It appears that Linnæus upon the whole, enjoyed a good conſtitution; but that he was ſometimes ſeverely afflicted with a *hemicrania*, and was not exempted from the gout. About the cloſe of 1776, he was ſeized with an apoplexy, which left him paralytic; and at the beginning of the year 1777, he ſuffered another ſtroke, which very much impaired his mental powers. But the diſeaſe ſuppoſed to have been the more immediate cauſe of his death, was an ulceration of the urinary bladder; of which, after a tedious indiſpoſition, he died, January 11. 1778, in the 71ſt year of his age, —His principal other works, beſide thoſe already mentioned, are, The *Iter Oelandicum et Gotlandicum*, *Iter Scanicum*, *Flora Suecica*, *Fauna Suecica*, *Materia Medica*, *Philoſophia Botanica*, *Genera Morborum*, different papers in the *Acta Upſalienſia*, and the *Amænitates Academicæ*. The laſt of this great man's treatiſes was the *Mantiſſa Altera*, publiſhed in 1771; but before his death he had finiſhed the greateſt part of the *Mantiſſa Tertia*, afterwards completed and publiſhed by his ſon.

To the lovers of ſcience it will not appear ſtrange, nor will it be unpleaſant to hear, that uncommon reſpect was ſhown to the memory of this great man. We are told, "that on his death a general mourning took place at Upſal, and that his funeral proceſſion was attended by the whole univerſity, as well profeſſors as ſtudents, and the pall ſupported by ſixteen doctors of phyſic, all of whom had been his pupils." The king of Sweden, after the death of Linnæus, ordered a medal to be ſtruck, of which one ſide exhibits Linnæus's buſt and name, and the other Cybele, in a dejected attitude, holding in her left hand a key, and ſurrounded with animals and growing plants; with this legend, *Deam luctus angit amiſſi*; and beneath, *Poſt obitum Upſaliæ, die* x. *Jan.* M.DCC.LXXVIII. *Rege jubente.*—The ſame generous monarch not only honoured the Royal Academy of Sciences with his preſence when Linnæus's commemoration was held at Stockholm, but, as a ſtill higher tribute, in his ſpeech from the throne to the aſſembly of the ſtates, he lamented Sweden's loſs by his death. Nor was Linnæus honoured only in his own country. The late worthy profeſſor of botany at Edinburgh, Dr Hope, not only pronounced an eulogium in honour of him before his ſtudents at the opening of his lectures in the ſpring 1778, but alſo laid the foundation ſtone of a monument (which he afterwards erected) to his memory, in the botanic garden there; which, while it perpetuates the name and merits of Linnæus, will do honour to the founder, and, it may be hoped, prove the means of raiſing an emulation favourable to that ſcience which this illuſtrious Swede ſo highly dignified and improved.

As to the private and perſonal character of this illuſtrious philoſopher: His ſtature was diminutive and puny; his head large, and its hinder part very high; his look was ardent, piercing, and apt to daunt the beholder; his ear not ſenſible to muſic; his temper quick, but eaſily appeaſed.

Nature had, in an eminent manner, been liberal in the endowments of his mind. He ſeems to have been poſſeſſed of a lively imagination, corrected however by a ſtrong judgement, and guided by the laws of ſyſtem. Add to theſe, the moſt retentive memory, an unremitting induſtry, and the greateſt perſeverance in all his purſuits; as is evident from that continued vigour with which he proſecuted the deſign, that he appears to have formed ſo early in life, of totally reforming and fabricating anew the whole ſcience of natural hiſtory; and this fabric he raiſed, and gave to it a degree of perfection unknown before; and had moreover the uncommon felicity of living to ſee his own ſtructure riſe above all others, notwithſtanding every diſcouragement its author at firſt laboured under, and the oppoſition it afterwards met with. Neither has any writer more cautiouſly avoided that common error of building his own fame on the ruin of another man's. He everywhere acknowledged the ſeveral merits of each author's ſyſtem; and no man appears to have been more ſenſible of the partial defects of his own. Thoſe anomalies which had principally been the objects of criticiſm, he well knew every artificial arrangement muſt abound with; and having laid it down as a firm maxim, that every ſyſtem muſt finally reſt on its intrinſic merit, he willingly commits his own to the judgement of poſterity. Perhaps there is no circumſtance of Linnæus's life which ſhows him in a more dignified light than his conduct towards his opponents. Diſavowing controverſy, and juſtly conſidering it as an unimportant and fruitleſs ſacrifice of time, he never replied to any, numerous as they were at one ſeaſon.

To all who ſee the aid this extraordinary man has brought to natural ſcience, his talents muſt appear in a very illuſtrious point of view; but more eſpecially to thoſe who, from ſimilarity of taſtes, are qualified to ſee more diſtinctly the vaſt extent of his original deſign, the greatneſs of his labour, and the elaborate execution he has given to the whole. He had a happy command

mand of the Latin tongue, which is more the language of ſcience; and no man ever applied it more ſucceſsfully to his purpoſes, or gave to deſcription ſuch copiouſneſs, united with that preciſion and conciſeneſs which ſo eminently characterize his writings.

The ardour of Linnæus's inclinations to the ſtudy of nature, from his earlieſt years, and that uncommon application which he beſtowed upon it, gave him a moſt comprehenſive view both of its pleaſures and uſefulneſs, at the ſame time that it opened to him a wide field hitherto but little cultivated, eſpecially in his own country. Hence he was early led to regret, that the ſtudy of natural hiſtory, as a public inſtitution, had not made its way into the univerſities; in many of which, logical diſputations and metaphyſical theories had too long prevailed, to the excluſion of more uſeful ſcience. Availing himſelf therefore of the advantages which he derived from a large ſhare of eloquence, and an animated ſtyle, he never failed to diſplay, in a lively and convincing manner, the relation this ſtudy hath to the public good; to incite the great to countenance and protect it; to encourage and allure youth into its purſuits, by opening its manifold ſources of pleaſure to their view, and ſhowing them how greatly this agreeable employment would add, in a variety of inſtances, both to their comfort and emolument. His extenſive view of natural hiſtory, as connected with almoſt all the arts of life, did not allow him to confine theſe motives and incitements to thoſe only who were deſigned for the practice of phyſic. He alſo laboured to inſpire the great and opulent with a taſte for this ſtudy; and wiſhed particularly that ſuch as were devoted to an eccleſiaſtic life ſhould ſhare a portion of natural ſcience; not only as a means of ſweetening their rural ſituation, confined, as many are, perpetually to a country reſidence, but as what would almoſt inevitably lead, in a variety of inſtances, to diſcoveries which only ſuch ſituations could give riſe to, and which the learned in great cities could have no opportunities to make. Not to add, that the mutual communication and enlargement of this kind of knowledge among people of equal rank in a country ſituation, muſt prove one of the ſtrongeſt bonds of union and friendſhip, and contribute, in a much higher degree than the uſual periſhing amuſements of the age, to the pleaſures and advantage of ſociety.

Linnæus lived to enjoy the fruit of his own labour in an uncommon degree. Natural hiſtory raiſed itſelf in Sweden, under his culture to a ſtate of perfection unknown elſewhere; and was from thence diſſeminated through all Europe. His pupils diſperſed themſelves all over the globe; and, with their maſter's fame, extended both ſcience and their own. More than this he lived to ſee the ſovereigns of Europe eſtabliſh ſeveral public inſtitutions in favour of this ſtudy; and even profeſſorſhips eſtabliſhed in divers univerſities for the ſame purpoſe, which do honour to their founders and patrons, and which have excited a curioſity for the ſcience, and a ſenſe of its worth, that cannot fail to further its progreſs, and in time raiſe it to that rank which it is entitled to hold among the purſuits of mankind.

LINNET. See Fringilla, Ornithology *Index*.

LINSEED, the ſeed of the plant linum.—Linſeed ſteeped and bruiſed in water gives it very ſoon a thick mucilaginous nature, and communicates much of its emollient virtue to it. See Linum.

LINT. See Flax; Linen; and Linum, Botany *Index*.

Lint, in *Surgery*, is the ſcrapings of fine linen, uſed by ſurgeons in dreſſing wounds. It is made into various forms, which acquire different names according to the difference of the figures.—Lint made up in an oval or orbicular form is called a *pledget*; if in a cylindrical form, or in ſhape of a date, or olive-ſtone, it is called a *doſſil*.

Theſe different forms of lint are required for many purpoſes; as, 1. To ſtop blood in freſh wounds, by filling them up with dry lint before the application of a bandage: though, if ſcraped lint be not at hand, a piece of fine linen may be torn into ſmall rags, and applied in the ſame manner. In very large hæmorrhages the lint or rags ſhould be firſt dipped in ſome ſtyptic liquor, as alcohol, or oil of turpentine; or ſprinkled with ſome ſtyptic powder. 2. To agglutinate or heal wounds; to which end lint is very ſerviceable, if ſpread with ſome digeſtive ointment, balſam, or vulnerary liquor. 3. In drying up wounds and ulcers, and forwarding the formation of a cicatrix. 4. In keeping the lips of wounds at a proper diſtance, that they may not haſtily unite before the bottom is well digeſted and healed. 5. They are highly neceſſary to preſerve wounds from the injuries of the air.—Surgeons of former ages formed compreſſes of ſponge, wool, feathers, or cotton; linen being ſcarce: but lint is far preferable to all theſe, and is at preſent univerſally uſed.

LINTERNUM, or Literum, in *Ancient Geography*, a city of Campania, ſituated at the mouth of the Clanius, which is alſo called Liturnus, between Cumæ and Vulturnum. It received a Roman colony at the ſame time with Puteoli and Vulturnum; was improved and enlarged by Auguſtus; afterwards forfeited its right of colonyſhip, and became a prefecture. Hither Scipio Africanus the Elder retired from the mean envy of his ungrateful countrymen; and here he died, and was buried: though this laſt is uncertain, he having a monument both here and at Rome. No veſtige of the place now remains.

LINTSTOCK, in military affairs, a wooden ſtaff about three feet long, having a ſharp point in one end and a ſort of fork or crotch on the other; the latter of which ſerves to contain a lighted match, and by the former the lintſtock is occaſionally ſtuck in the ground, or in the deck of a ſhip during an engagement. It is very frequently uſed in ſmall veſſels, where there is commonly one fixed between every two guns, by which the match is always kept dry, and ready for firing.

LINTZ, a very handſome town of Germany, and capital of Upper Auſtria, with two fortified caſtles; the one upon a hill, the other below it. Here is a hall in which the ſtates aſſemble, a bridge over the Danube, a manufacture of gunpowder, and ſeveral other articles. It was taken by the French in 1741, but the Auſtrians retook it in the following year. E. Long. 14. 33. N. Lat. 48. 16.

Lintz, a town of Germany, in the circle of the Lower Rhine, and electorate of Cologne, ſubject to that elector. It is ſeated on the river Rhine, in E. Long. 7. 1. N. Lat. 50. 31.

LINUM, FLAX; a genus of plants belonging to the pentandria claſs: and in the natural method ranking under the 14th order, *Gruinales*. See BOTANY *Index*.

LINUS, in claſſical hiſtory, a native of Colchis, cotemporary with Orpheus, and one of the moſt ancient poets and muſicians of Greece. It is impoſſible, at this diſtance of time, to diſcover whether Linus was the diſciple of Orpheus, or Orpheus of Linus. The majority, however, ſeem to decide this queſtion in favour of Linus. According to Archbiſhop Uſher, he flouriſhed about 1280 B. C. and he is mentioned by Euſebius among the poets who wrote before the time of Moſes. Diodorus Siculus tells us, from Dionyſius of Mitylene the hiſtorian, who was cotemporary with Cicero, that Linus was the firſt among the Greeks who invented verſes and muſic, as Cadmus firſt taught them the uſe of letters. The ſame writer likewiſe attributes to him an account of the exploits of the firſt Bacchus, and a treatiſe upon Greek mythology, written in Pelaſgian characters, which were alſo thoſe uſed by Orpheus, and by Pronapides the preceptor of Homer. Diodorus ſays that he added the ſtring *lichanos* to the Mercurian lyre; and aſcribes to him the invention of rhime and melody; which Suidas, who regards him as the moſt ancient of lyric poets, confirms. Mr Marpurg tells us, that Linus invented cat-gut ſtrings for the uſe of the lyre, which, before his time, was only ſtrung with thongs of leather, or with different threads of flax ſtrung together. He is ſaid by many writers to have had ſeveral diſciples of great renown; among whom were Hercules, Thamyris, and, according to ſome, Orpheus.—Hercules, ſays Diodorus, in learning from Linus to play upon the lyre, being extremely dull and obſtinate, provoked his maſter to ſtrike him; which ſo enraged the young hero, that, inſtantly ſeizing the lyre of the muſician, he beat out his brains with his own inſtrument.

LION, in *Zoology*. See FELIS, MAMMALIA *Index*.

LIONCELLES, in *Heraldry*, a term uſed for ſeveral lions borne in the ſame coat of arms.

LIOTARD, called the *Turk*, an eminent painter, was born at Geneva in 1702, and by his father was deſigned for a merchant; but, by the perſuaſion of his friends, who obſerved the genius of the young man, he was permitted to give himſelf up to the art of painting. He went to Paris in 1725, and in 1738 accompanied the marquis de Puiſieux to Rome, who was going ambaſſador to Naples. At Rome he was taken notice of by the earls of Sandwich and Beſborough, then Lord Duncannon, who engaged Liotard to go with them on a voyage to Conſtantinople. There he became acquainted with the late Lord Edgecumbe, and Sir Everard Fawkener, our ambaſſador, who perſuaded him to come to England, where he ſtaid two years. In his journey to the Levant he had adopted the eaſtern habit, and wore it here with a very long beard. It contributed much to the portraits of himſelf, and ſome thought to draw cuſtomers; but he was really a painter of uncommon merit. After his return to the continent, he married a young wife, and ſacrificed his beard to Hymen. He came again to England in 1772, and brought a collection of pictures of different maſters, which he ſold by auction, and ſome pieces of glaſs painted by himſelf, with ſurpriſing effect of light and ſhade, but a mere curioſity, as it was neceſſary to darken the room before they could be ſeen to advantage; he affixed, too, as uſual, extravagant prices to them. He ſtaid here about two years, as in his former journey. He has engraved ſome Turkiſh portraits, one of the empreſs queen and the eldeſt archducheſs in Turkiſh habits, and the heads of the emperor and empreſs. He painted admirably well in miniature; and finely in enamel, though he ſeldom practiſed it. But he is beſt known by his works in crayons. His likeneſſes were as exact as poſſible, and too like to pleaſe thoſe who ſat to him; thus he had great buſineſs the firſt year, and very little the ſecond. Devoid of imagination, and one would think of memory, he could render nothing but what he ſaw before his eyes. Freckles, marks of the ſmallpox, every thing found its place; not ſo much from fidelity, as becauſe he could not conceive the abſence of any thing that appeared to him. Truth prevailed in all his works, grace in very few or none. Nor was there any eaſe in his outline; but the ſtiffneſs of a buſt in all his portraits. *Walpole*.

LIP, in *Anatomy*. See there, N° 102.

HARE-Lip, a diſorder in which the upper lip is in a manner ſlit or divided, ſo as to reſemble the upper lip of a hare, whence the name. See SURGERY.

LIPARA, in *Ancient Geography*, the principal of the iſlands called *Æolia*, ſituated between Sicily and Italy, with a cognominal town, ſo powerful as to have a fleet, and the other iſlands in ſubjection to it. According to Diodorus Siculus, it was famous for excellent harbours and medicinal waters. He informs us alſo, that it ſuddenly emerged from the ſea about the time of Hannibal's death. The name is Punic, according to Bochart: and given it, becauſe, being a volcano, it ſhone in the night. It is now called *Lipari*, and gives name to nine others in its neighbourhood; viz. Stromboli, Pare, Rotto, Panaria, Saline, Volcano, Fenicuſa, Alicor, and Uſtica. Theſe are called, in general, the *Lipari Iſlands*. Some of theſe are active volcanoes at preſent, though Lipari is not. It is about 15 miles in circumference; and abounds in corn, figs and grapes, bitumen, ſulphur, alum, and mineral waters.

LIPARI, an ancient and very ſtrong town, and capital of an iſland of the ſame name in the Mediterranean, with a biſhop's ſee. It was ruined by Barbaroſſa in 1544, who carried away all the inhabitants into ſlavery, and demoliſhed the place; but it was rebuilt by Charles V. E. Long. 15. 30. N. Lat. 38. 35.

LIPARI, properly, is the general name of a cluſter of iſlands. Theſe, according to Mr Houel, are principally ten in number, the reſt being only uninhabitable rocks of narrow extent. The largeſt and the moſt populous of them, that above mentioned, communicates its name to the reſt. *Volcano* is a deſert but habitable iſland, lying ſouth from the large iſland of Lipari. *Salines*, which lies weſt-north-weſt from the ſame iſland; *Felicudi*, nearly in the ſame direction, but 20 miles farther diſtant; and *Alicudi*, 10 miles ſouth-weſt of Felicudi; are inhabited. *Pannari* is eaſt of Lipari, the famous *Stromboli* north-eaſt, and both of them are inhabited.

The reſt are in a deſert ſtate; ſuch as *Baziluzzo*, which was formerly inhabited; *Attalo*, which might be inhabited; and *L'Exambianca*, on which ſome remains of ancient dwellings are ſtill to be found. *L'Eſcanera* is nothing but a bare rock.

The *Formicoli*, a word ſignifying *ants*, are a chain of ſmall black cliffs which run to the north-eaſt of Lipari, till within a little way of Exambianca and Eſcanera, riſing more or leſs above the water, according as the ſea is more or leſs agitated.

Ancient authors are not agreed with reſpect to the number of the Lipari iſlands. Few of thoſe by whom they are mentioned appear to have ſeen them; and in places ſuch as theſe, where ſubterraneous fires burſt open the earth and raiſe the ocean from its bed, terrible changes muſt ſometimes take place. *Volcanello* and *Volcano* were once ſeparated by a ſtrait ſo as to form two iſlands. The lava and aſhes have filled up the intervening ſtrait; and they are now united into one iſland, and have by this change become much more habitable.

The caſtle of Lipari ſtands upon a rock on the eaſt quarter of the iſland. The way to it from the city leads up a gentle declivity. There are ſeveral roads to it. This caſtle makes a part of the city; and on the ſummit of the rock is the citadel, in which the governor and the garriſon reſide. The cathedral ſtands in the ſame ſituation. Here the ancients, in conformity to their uſual practice, had built the temple of a tutelary god. This citadel commands the whole city; and it is acceſſible only at one place. Were an hoſtile force to make a deſcent on the iſland, the inhabitants might retreat hither, and be ſecure againſt all but the attacks of famine.

The ancient inhabitants had alſo fortified this place. Conſiderable portions of the ancient walls are ſtill ſtanding in different places, particularly towards the ſouth: Their ſtructure is Grecian; and the ſtones are exceedingly large, and very well cut. The layers are three feet high, which ſhows them to have been raiſed in ſome very remote period. Theſe remains are ſurrounded with modern buildings. The remains of walls, which are ſtill to be ſeen here, have belonged not only to temples, but to all the different ſorts of buildings which the ancients uſed to erect. The vaults, which are in a better ſtate of preſervation than any of the other parts of theſe monuments, are now converted to the purpoſes of a priſon.

In the city of Lipari there are convents of monks of two different orders; but there are no convents for women, that is to ſay, no cloiſters in which women are confined; thoſe, however, whoſe heads and hearts move them to embrace a ſtate of pious celibacy, are at liberty to engage in a monaſtic life, with the concurrence of their confeſſors. They put on the ſacred habit, and vow perpetual virginity, but continue to live with their father and mother, and mix in ſociety like other women. The vow and the habit even enlarge their liberty. This cuſtom will, no doubt, M. Houel obſerves, appear very ſtrange to a French woman; but this was the way in which the virgins of the primitive church lived. The idea of ſhutting them up together did not occur till the fifth century. The life of theſe religious ladies is leſs gloomy than that which thoſe under the ſame vows lead in other countries. They wear clothes of particular colours, according as they belong to this or that order. Their dreſs gives them a right to frequent the churches at any hours; and the voice of cenſure, which takes particular pleaſure in directing her attacks againſt pious ladies, goes ſo far as to aſſert, that ſome young women aſſume the habit with no other views but that they may enjoy greater freedom.

In this iſland oxen of a remarkably beautiful ſpecies are employed in ploughing the ground. The ancient plough is ſtill in uſe here. The mode of agriculture practiſed here is very expeditious. One man traces a furrow, and another follows to ſow in it grain and pulſe. The ploughman, in cutting the next furrow, covers up that in which the ſeed has been ſown: and thus the field is both ploughed and ſown at once. Nature ſeems to be here uncommonly vigorous and fertile. Vegetation is here more luxuriant, and animals gayer and more healthful, than almoſt anywhere elſe.

Near the city of Lipari, the traveller enters deep narrow roads, of a very ſingular appearance. The whole iſland is nothing but an aſſemblage of mountains, all of them conſiſting of aſhes or lava diſcharged from the depths of the volcano by which it was at firſt produced. The particles of this puzzolana, or aſhes, are not very hard; the action of the rain water has accordingly cut out trenches among the mountains; and theſe trenches being perhaps leſs uneven than the reſt of the ſurface, have of conſequence been uſed as roads by the inhabitants, and have been rendered much deeper by being worn for ſo many ages by the feet of men and other animals. Theſe roads are more than five or ſix fathoms deep, and not more than ſeven or eight feet wide. They are very crooked, and have echoes in ſeveral places. You would think that you were walking through narrow ſtreets without doors or windows. Their depth and windings ſhelter the traveller from the ſun while he is paſſing through them; and he finds them deliciouſly cool.

The firſt volcanic eruption in the Lipari iſlands mentioned in hiſtory, is that of which Callias takes notice in his hiſtory of the wars in Sicily. Callias was contemporary with Agathocles. That eruption continued without interval for ſeveral days and nights; and threw out great ſtones, which fell at more than a mile's diſtance. The ſea boiled all around the iſland. The works of Callias are loſt, and we know not whether he deſcended to a detail of particulars concerning the ravages produced by this eruption. Under the conſulſhip of Æmilius Lepidus and L. Aurelius Oreſtes, 126 years before the Chriſtian era, theſe iſlands were affected with a dreadful earthquake. The burning of Ætna was the firſt cauſe of that. Around Lipari and the adjacent iſlands, the air was all on fire. Vegetation was withered; animals died; and fuſible bodies, ſuch as wax and reſin, became liquid. If the inhabitants of Lipari, from whom our author received theſe facts, and the writers who have handed down an account of them, have not exaggerated the truth, we muſt believe that the ſea then boiled around the iſland; the earth became ſo hot as to burn the cables by which veſſels were fixed to the ſhore, and conſumed the planks, the oars, and even the ſmall boats.

Pliny, the naturaliſt [*], ſpeaks of another ſimilar event which happened 30 or 40 years afterwards, in

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[*] Lib. ii. cap. 100.

the time of the war of the allied ſtates of Italy againſt Rome. One of the Æolian iſlands, ſays he, was all on fire as well as the ſea; and that prodigy continued to appear, till the ſenate appeaſed, by a deputation, the wrath of the gods. From the time of that war, which happened 86 years before the birth of our Saviour, till the year 144 of our era, we have no account of any eruption of theſe volcanoes: and from that period again, till the year 1444, we hear of no exploſion from them, that is, for the ſpace of 1300 years. But, at that time, both Sicily and the Æolian iſles were agitated by dreadful ſhocks of earthquakes: the volcano of theſe iſles poured forth ſtreams of lava with an awful violence, and emitted a volume of flame and ſmoke which roſe to an amazing height. After that it diſcharged enormous ſtones which fell at the diſtance of more than ſix miles.

A century later, in the year 1550, the fury of this volcano was again renewed. The aſhes and ſtones diſcharged from the crater filled up the ſtrait between Volcano and Volcanello.

About two centuries after that, in the year 1739, there was a ſixth eruption. The burſtings of the volcanic fire were attended with a noiſe ſo dreadful, that it was heard as far as Melazzo in Sicily.

Father Leandro Alberti ſays, that on one of thoſe dreadful occaſions, the women of Lipari, after imploring in vain all the ſaints, vowed to drink no more wine if the volcano ſhoud ſpare them. Their giving up this ſmall gratification was doubtleſs of great ſervice; yet the eruptions ſtill continue, and have even become more frequent ſince that time. Only 36 years intervened between this eruption and that which happened in the year 1775. The whole iſland was then ſhaken; ſubterraneous thunder was heard; and conſiderable ſtreams of flame, with ſmoke, ſtones, and vitreous lava, iſſued from the crater. Lipari was covered over with aſhes; and part of theſe was conveyed by the winds all the way into Sicily. Five years after, however, in the month of April 1780, there iſſued a new exploſion from Volcano; the ſmoke was thick, the ſhocks conſtant, and the ſubterraneous noiſe very frequent. So great was the conſternation among the inhabitants of Lipari on this occaſion, that the commander Deodati Dolomieu, who viſited theſe iſlands not long after that event, informs us, that the inhabitants in general, but eſpecially the women, devoted themſelves as ſlaves to the ſervice of the bleſſed virgin; and wore on their arms, as tokens of their ſervitude, ſmall iron chains, which they ſtill continue to wear.

This act of piety, however, was not ſo efficacious as the deputation of the ſenate had been. For after that deputation, more than 200 years paſſed before the Æolian iſles were afflicted by any other eruption, at leaſt by any conſiderable one: Whereas, in three years after the ladies devoted themſelves in ſo ſubmiſſive a manner to the ſervice of the virgin, the iſles of Lipari were agitated anew by that fatal earthquake which ravaged Calabria, and part of Sicilly, on the 5th of February 1783.

The dry baths of St Calogero, in the iſland of Lipari, are ſtoves, where ſulphureous exhalations, known to be of a ſalutary nature, aſcend out of the earth by holes or ſpiracles. A range of apartments are built around the place where the exhalations ariſe. The heat is communicated through thoſe apartments, in ſuch a way, that when entering at one end, you advance towards the other, the heat ſtill increaſes upon you till you gain the middle apartment, and again diminiſhes in the ſame manner as you proceed from the middle to the other end of the range of chambers. In conſequence of this diſpoſition of theſe apartments, the ſick perſon can make choice of that temperature which beſt ſuits the nature of his diſeaſe. There are a few miſerable huts and a ſmall chapel for the accommodation of the people who repair to theſe baths. The people of the place are ready to attend them. Phyſicians likewiſe follow their patients thither, when the diſeaſe is of ſuch a nature as to render their attendance requiſite, and the patient rich enough to afford them handſome fees: but there is no phyſician ſettled in the place. Beſides theſe dry baths, there are baths of hot water diſtinguiſhed by the name of *St Calogero's baths*. There are around them buildings ſufficient to lodge a conſiderable number of ſick people with their neceſſary attendants. At preſent, however, thoſe buildings are but in a bad condition.

The baths conſiſt of two halls; one ſquare, the other round. The former is antique; it has been built by the Romans; it is arched with a cupola, and 12 feet in diameter; it has been repaired: The other is likewiſe arched with a cupola both within and without. The water comes very hot into the firſt. It guſhes up from among pieces of lava, which compoſe a part of the mountain at the foot of which theſe baths are built. Thoſe ſtones remain in their natural ſtate. All that has been done is the raiſing of a ſquare building encloſing them. Within that building the ſick perſons either ſit down on the ſtones, or immerſe themſelves in the intervening cavities which are filled with water. They continue there for a certain time, and approach nearer to, or remain at a farther diſtance from the ſpring, according as their phyſician directs. The place ſerves alſo as a ſtove. The hot vapours ariſing from the water communicate to the ſurrounding atmoſphere a conſiderable degree of heat. It is indeed not inferior to that of the hot baths of Termini, which owe their heat to a ſimilar cauſe. In theſe baths, therefore, a perſon can have the benefit either of bathing in the hot water, or of expoſing himſelf to the vapour, the heat of which is more moderate. The bath before mentioned, under the appellation of *dry bath*, is alſo a ſtove; but the hot vapour with which it is filled iſſues directly from the volcano. The place of the bath is, however, at ſuch a diſtance from the volcanic focus, that the heat is not at all intolerable.

The mountain at the foot of which theſe baths are ſituated is round, and terminates at the ſummit in a rock of petrified aſhes, which are very hard and of a very fine grain. This petrification conſiſts of pretty regular ſtrata, and appears to have been greatly prior in its origin to the adjacent rocks; which conſiſt likewiſe of aſhes, but aſhes that have been depoſited at a much later period. From this rock there proceeds likewiſe a ſtream of hot water, by which ſome mills in the neighbourhood are moved.

It cannot but appear ſurpriſing, that nature has placed nearly on the ſummit of a volcanic mountain ſprings which ſupply ſo conſiderable a quantity of water. To account for ſuch a phenomenon would be well worthy of ſome ingenious naturaliſt. Nor are theſe hot ſprings all; proceeding around the ſame hill, at about a mile's diſtance, we find a ſpring of cold water riſing from the ſummit of the ſame rock, which on the north-weſt produces three hot ſprings. The cold water is very pleaſant to drink, and much uſed both by men and cattle.

Among theſe mountains there are many enormous looſe maſſes of lava, the appearance of which, M. Houel informs us, naturally leads the obſerver to take notice, that the lava of the volcano of Lipari is of a much greater diverſity of colours, and thoſe richer and more lively, than the lava of Veſuvius and Ætna. The lava of Lipari is in ſome places, for ſeveral miles, of a beautiful red colour. It contains likewiſe in great abundance ſmall black cryſtallized ſcoriæ, as well as the ſmall white grains which are commonly found in lava.

Among the eminences which overlook the city of Lipari, there are ſome rocks of a ſpecies which is very rare in Europe. Theſe are large maſſes of vitrified matter, which riſe ſix or eight feet above the ſurface of the ground, and appear to extend to a great depth under it. They exiſt, through that range of mountains, in enormous maſſes, mixed with lavas of every different colour, and always ſtanding detached and inſulated. Were they cut and followed under ground, they would probably be found to exiſt in immenſe quarries in the bowels of the earth. The glaſs of which they conſiſt might be employed with great advantage in manufactures. It is ready made, and might be eaſily purified. It is green, compact, and tranſparent.

The cultivation of the ground is the chief employment of the inhabitants of Lipari. The poſſeſſion of a few acres of land here gives a man great importance. Parents, when they ſettle their children, rather give them money than any part of their lands.

More than two-thirds of the iſland is planted with vines: three-fourths of the grapes which theſe produce are dried, and ſent moſtly to London under the name of *paſſola*. There are different ſorts of paſſola: one of theſe, called the *black paſſolina*, is prepared from a particular kind of grape, of which the berries are uncommonly ſmall; and ſold to Marſeilles, Holland, and Trieſte. The vines are in ſmall arbours, which riſe only to the height of two feet and a half above the ground. Under thoſe arbours there grow beans, gourds, and other leguminous vegetables. In ſo hot a climate, the ſhade of the vines does not injure but protect the vegetables growing under it: they would otherwiſe be withered by the heat of the ſun.

The method of preparing paſſola and paſſolina is curious enough: They firſt make a lixivium of common aſhes; after boiling this, they paſs it through a cloth or a ſieve; they then put it again on the fire; and when it is obſerved to boil hard, ſuddenly immerſe the grapes, but inſtantly bring them out again, and expoſe them to the ſun to dry on broad frames of cane. When ſufficiently dry, the raiſins are put into caſks and barrels to be ſold and exported. The number of caſks of different ſorts of raiſins annually exported from Lipari are eſtimated at 10,000.

This iſland likewiſe produces figs. There is ſome white malmſey and a little red wine exported from it.

About 60 or 80 years ſince, ſulphur was one of the articles with which the inhabitants of this iſland ſupplied foreign merchants. But that trade has been given up; from an idea which the Lipareſe entertain, that ſulphur infects the air ſo as to injure the fertility of the vines. The ſame prejudice prevails in Sicily, but it ſeems to be ill founded.

There are courts of juſtice in Lipari of the ſame powers and character with thoſe in the cities of Sicily. Cauſes of more than ordinary importance are carried to Palermo.

The iſland is entirely free from every kind of impoſition. The king receives nothing from it; becauſe Count Roger anciently beſtowed on its biſhop all his rights of royalty over Lipari. The biſhop there received annually from the inhabitants a tenth part of the products of their lands. They afterwards, to prevent fraud, eſtimated the value of that tithe for one year; and on the condition of their paying in future a ſum of money equal to what that year's tithe was valued at, he not only gave up his right to the tithe, but alſo ceded to them a conſiderable extent of land which belonged to him.

In the archiepiſcopal palace, and in the palace of the Baron de Monizzio, there are ſome noble pieces of painting by Sicilian painters:—A St Peter, a St Roſalia, Jeſus diſputing with the Jewiſh doctors, the adulterous woman, the incredulity of St Thomas.

LIPOTHYMIA, FAINTING, may ariſe from ſeveral cauſes; as too violent exerciſe, ſuppreſſion of the menſes or other accuſtomed evacuations, &c. See MEDICINE *Index*.

LIPPA, a town of Hungary, with a caſtle. It was taken by the Turks in 1552; by the Imperialiſts in 1688; and by the Turks again in 1691; who abandoned it in 1675; after having demoliſhed the fortifications. It is ſeated on a mountain, in E. Long. 21. 55. N. Lat. 36. 5.

LIPPE, the capital of a county of the ſame name in Germany, and the circle of Weſtphalia. It is ſeated on a river of the ſame name, and was formerly the reſidence of the principal branch of the houſe of Lippe. It is now in the poſſeſſion of the king of Pruſſia, and carries on a good trade in preparing timber for building veſſels on the Rhine, with which it has a communication by the river Lippe. The country round it is unwholeſome and marſhy. E. Long. 8. 12. N. Lat. 51. 43.

LIPPI, LORENZO, a painter of hiſtory and portraits, was born in 1606, and learned the principles of painting from Matteo Roſelli. He had an exquiſite genius for muſic and poetry, as well as for painting, and in the latter his proficiency was ſo great, that ſome of his compoſitions in the hiſtorical ſtyle were taken for thoſe of Roſelli. However, growing at laſt diſſatisfied with the manner of that maſter, he choſe the manner of Santi di Titi, who was excellent both in deſign and invention, and appeared to have more of ſimple nature and truth in his compoſitions than any other artiſt of that time. At Florence Lippi painted many grand deſigns for the chapels and convents, by which he enlarged his reputation; and at the court of Inſpruck, he painted a great number of portraits of the firſt nobility,

bility, which were deſervedly admired. Yet, although he was fond of imitating ſimple nature without any embelliſhments from invention, his works are held in the higheſt eſteem for the graceful airs of the heads, for the correctneſs of his outline, and for the elegant diſpoſition of the figures. He died in 1664.

LIPSIUS, Justus, a learned critic, was born at Iſch, a ſmall village near Bruſſels, in 1547. After having diſtinguiſhed himſelf in polite literature, he became ſecretary to Cardinal de Granvellen at Rome, where the beſt libraries were open to him; and he ſpent much labour in collating the MSS. of ancient authors. He lived 13 years at Leyden; during which he compoſed and publiſhed what he eſteems his beſt works; but ſettled at Louvain, where he taught polite literature with great reputation. He was remarkable for unſteadineſs in religion, fluctuating often between the Proteſtants and Papiſts; but he became finally a bigotted catholic. He died at Louvain in 1606; and his works are collected in ſix volumes folio.

LIQUEFACTION, an operation by which a ſolid body is reduced into a liquid by the action of heat. See Fluidity, Chemistry *Index*.

LIQUID, a body which has the property of fluidity, as water, mercury, &c. See Fluid.

Liquid, among grammarians, is a name applied to certain conſonants oppoſed to mutes. Thus l, m, n, and r, are liquids.

LIQUIDAMBAR, sweet-gum-tree, a genus of plants, belonging to the monœcia claſs; and in the natural method ranking with thoſe of which the order is doubtful. See Botany *Index*.

LIQUOR, a name for any fluid ſubſtance of the aqueous or ſpirituous kind.

The principal beverage amongſt the Jews, as well as the Greeks and Romans, in their early ſtate, was water, milk, and the juices of various plants infuſed therein. For a long time, under the commonwealth of Rome, wine was ſo ſcarce, that in their ſacrifices to the gods the libations were made with milk only. Wine did not become common there till A. U. C. 600, when vines began to be planted.

Liquor of Flints. See Chemistry, N° 1450.

Smoking Liquor of Libavius. See Chemistry, N° 1809.

Mineral Anodyne Liquor of Hoffman. This is a compoſition of highly rectified ſpirit of wine, vitriolic ether, and a little of the dulcified oil of vitriol. See Chemistry, N° 849.

LIQUORICE. See Glycyrrhiza, Botany and Materia Medica *Index*.

LIRIODENDRON, the tulip tree, a genus of plants belonging to the polyandria claſs, and in the natural method ranking under the 52d order, *Coadunatæ*. See Botany *Index*.

LIS or Lys, *John Vander*, painter of hiſtory, landſcapes, and converſations, was born at Oldenburgh in 1570, but went to Haerlem to place himſelf as a diſciple under Henry Goltzius; and as he was endowed with great natural talents, he ſoon diſtinguiſhed himſelf in that ſchool, and imitated the manner of his maſter with great ſucceſs. He adhered to the ſame ſtyle till he went to Italy; where, having viſited Venice and Rome, he ſtudied the works of Titian, Tintoretto, Paolo Veroneſe, and Domenico Fetti. So effectually, that he improved his taſte and judgement, and altered his manner entirely. He ſoon received marks of public approbation: and his compoſitions became univerſally admired for their good expreſſion, for their lively and natural colouring, and the ſweetneſs and delicacy of his pencil: although it muſt be acknowledged, that he could never totally diveſt himſelf of the ideas and taſte peculiar to the Flemings. His ſubjects uſually were hiſtories taken from the ſacred writings, or the repreſentations of rural ſports, marriages, balls, and villagers dancing, dreſſed in Venetian habits; all which ſubjects he painted in a ſmall as well as a large ſize, with a number of figures, well deſigned, and touched with a great deal of delicacy. He was likewiſe accounted to paint naked figures admirably, with natural and elegant attitudes, and a very agreeable turn of the limbs. A capital picture of this maſter is, Adam and Eve lamenting the death of Abel; which is extremely admired, not only for the expreſſion, but alſo for the beauty of the landſcape: and in the church of St Nicholas at Venice is another of his paintings, repreſenting St Jerome in the deſert, with a pen in his hand, and his head turned to look at an angel, who is ſuppoſed to be ſounding the laſt trumpet. The colouring of this picture is rather too red; but it is deſigned in a fine ſtyle, and charmingly penciled. The paintings of this maſter are very rarely to be purchaſed. He died in 1629.

Lis, *John Vander*, of Breda, hiſtorical painter, was born at Breda about the year 1601, and became a diſciple of Cornelius Polemburg, whoſe manner he imitated with extraordinary exactneſs, in the tint of his colouring, his neatneſs of penciling, and the choice of his ſubjects. There are ſome paintings of this maſter's hand, which, though they appear to have ſomewhat leſs freedom and lightneſs of touch, are nearly equal to thoſe of Polemburg, and are frequently taken to be his. At Rotterdam, in the poſſeſſion of Mr Biſſchop, there is a delicate painting repreſenting Diana in the bath, attended by her nymphs; and his moſt capital performance, in England, is ſaid to be in the poſſeſſion of the viſcount Middleton. The portrait of Vander Lis, painted by himſelf, is in the poſſeſſion of Horace Walpole, Eſq. which is deſcribed by that ingenious gentleman, as being worked up equal to the ſmoothneſs of enamel.

LISBON, the capital of the kingdom of Portugal, ſituated in the province of Eſtremadura, on the banks of the river Tagus, in W. Long. 9. 25. N. Lat. 38. 25. It was anciently called *Oliſipo*, *Oliſippo*, and *Ulyſſipo*, which are ſuppoſed to be derived from the Phenician *Ulisubbo* or *Oliſippo*, ſignifying in that tongue a *pleaſant bay*, ſuch as that on which this city ſtands. It firſt became conſiderable in the reign of King Emmanuel; from that time it has been the capital of the kingdom, the reſidence of its monarchs, the ſeat of the chief tribunals, and offices of the metropolitans, a noble univerſity, and the receptacle of the richeſt merchandiſe of the Eaſt and Weſt Indies. Its air is excellent; being refreſhed by the delightful ſea breezes, and thoſe of the Tagus. The city extends for about two miles along the Tagus; but its breadth is inconſiderable. Like old Rome, it ſtands on ſeven hills: but the ſtreets in general are narrow and dirty, and ſome of them are very ſteep: neither are they lighted at night. The churches, in general, are very fine; but the magnificence of the chapel royal is amazing. Here is one of the fineſt harbours in the world; and there were a great number not only of fine churches and convents here, but alſo of other public buildings, and particularly of royal palaces, and others belonging to the grandees: but the greateſt part of them, and of the city, were deſtroyed by a moſt dreadful earthquake, on Nov. 1. 1755. from which it will require a long time to recover. The inhabitants, before the earthquake, did not at moſt exceed 150,000. The government of it is lodged in a council, conſiſting of a preſident, ſix counſellors, and other inferior officers. The harbour has water enough for the largeſt ſhips, and room enough for 10,000 ſail without being crowded. For its ſecurity, there is a fort at the mouth of the river, on each ſide, and a bar that runs acroſs it, and is very dangerous to paſs without pilots. Higher up, at a place where the river is conſiderably contracted, there is a fort called *Torre de Belem*, or the *Tower of Belem*, under whoſe guns all ſhips muſt paſs in their way to the city; and on the other ſide are ſeveral more forts. Before the earthquake, moſt of the private houſes were old and unſightly, with lattice windows; and the number of convents and colleges amounted to 50, namely, 32 for monks, and 18 for nuns. The king's principal palace ſtands on the river, and is large and commodious. Of the hoſpitals, that called the *Great* is obliged to receive all perſons, of what degree, nation, or religion ſoever, without exception. At the village of Belem, near Liſbon, is a noble hoſpital for decayed gentlemen who have ſerved the king, and have not wherewithal to maintain themſelves. That called the *Houſe of Mercy* is alſo a noble charity. In the centre of the city, upon one of the higheſt hills, is the caſtle, which commands the whole, being large and ancient, and having always a garriſon of four regiments of foot. The cathedral is a vaſt edifice of the Gothic kind, but heavy and clumſy: it contains, however, great riches; and is finely adorned within. The ſquare called *Roſſio* is large, and ſurrounded with magnificent buildings. The whole city is under the eccleſiaſtical juriſdiction of the patriarch, who was appointed in the year 1717. Here is alſo an archbiſhop, who has, or at leaſt had, before the erection of the patriarchate, a revenue of 40,000 cruſadoes, or 6000l. The univerſity, which was removed for ſome time to Coimbra, but afterwards reſtored to its ancient ſeat, makes a conſiderable figure, though much inferior to that of Coimbra.

LISBURN, a town of Ireland, in the county of Antrim and province of Ulſter, 73 miles from Dublin. It was burnt down about 50 years ago; but is now rebuilt in a neat and handſome manner, and has a large linen manufactory. It is ſeated on the river Laggan, in W. Long. 6. 20. N. Lat. 54. 31. It gives title of earl to the family of Vaughan, and formerly returned two members to parliament.

LISIEUX, a conſiderable town of France, in Upper Normandy, with a biſhop's ſee. The churches and religious houſes, and the biſhop's palace, are all very handſome ſtructures. It is a trading place; and is ſeated at the confluence of the rivers Arbeck and Gaſſi, in E. Long. 0. 20. N. Lat. 49. 11.

LISLE, a large, rich, handſome, and ſtrong town of French Flanders, of which it is the capital, with a ſtrong caſtle, and a citadel built by Vauban, and ſaid to be the fineſt in Europe, as well as the beſt fortified. The largeſt ſquare, and the public buildings, are very handſome; and they have manufactures of ſilks, cambrics, and camblets, as well as other ſtuffs, which have been brought to great perfection. It was taken by the duke of Marlborough, after three months ſiege and the loſs of many thouſands of men, in 1708, but reſtored to the French by the treaty of Utrecht, in conſideration of their demoliſhing the fortifications of Dunkirk. It was beſieged by the Auſtrians in 1792, who on the 29th of September began a heavy cannonading againſt it, which continued inceſſant till the 6th of October, when they were obliged to raiſe the ſiege, after having thrown into the city about 30,000 red-hot balls, beſides 6000 bombs. It is ſeated on the river Duele, 14 miles weſt of Tournay, 32 ſouth-weſt of Ghent, 37 north-weſt of Mons, and 130 north of Paris. E. Long. 3. 9. N. Lat. 50. 83.

LISLE, *Joſeph Nicholas de*, an eminent aſtronomer and geographer, was born at Paris in the year 1668. His father having taught him the principles of grammar, he afterwards attended lectures in the Mazarine college, where he delivered his rhetorical exerciſes in 1706. A total eclipſe of the ſun having taken place on the 12th of March that year, his taſte for mathematics was thus diſcovered, and he was accordingly placed under a proper tutor, who taught him the elements of geometry, fortification and mechanics; but his favourite ſtudy was the ſcience of aſtronomy.

In 1707 he was offered the place of an engineer at Martinico, which made him acquainted with the art of drawing, an acquiſition which proved highly uſeful to him in his geographical labours, and alſo in the ſtudy of aſtronomy. His father having got a copy of An Account of a Voyage to the South ſea from his ſon's maſter, young de Liſle was excited by the peruſal of it to the ſtudy of natural hiſtory, and he began to make collections of inſects, and ſketch their varieties; but being afterwards perſuaded that ſo extenſive a ſtudy, requiring ſuch immenſe collections to be made as he found in Aldrovandus, was wholly incompatible with that unremitting attention which his favourite ſcience required, he relinquiſhed it accordingly. The attention he paid to aſtronomical reſearches was ſo great, that he was conſidered as meriting the correſpondence of ſome of the ableſt aſtronomers of Europe at the early age of 21. In 1709 he made a wooden quadrant, which he divided with the utmoſt accuracy, and which anſwered the intended purpoſe in his early obſervations. He likewiſe conſtructed a table for M. Caſſini, of the right aſcenſions and declinations, adapted to all the degrees of latitude and longitude of the planets, and the obliquity of the ecliptic; this table was made uſe of by M. Caſſini in foretelling the occultations of the ſtars by the moon.

De Liſle being informed by Caſſini in 1710 of his method of repreſenting an eclipſe of the ſun, by the projection of a terreſtrial parallel on a plane; he inſtantly conceived the idea of applying it to every part of the earth, by means of a globe mounted and prepared for that purpoſe. Such aſtronomers as he made acquainted with his project, conceived it to be impracticable; but when the machine was completed, they beſtowed the higheſt encomiums on the noble invention. The firſt memorable obſervation made by de Liſle was that of the moon, on the 23d of January 1712, after which his labours experienced ſome interruption from bodily indiſpoſition. About this time the ſituation of his father's numerous family rendered it neceſſary that he ſhould provide for himſelf, ſo that he was obliged to make his aſtronomical knowledge ſubſervient to the abſurdities of aſtrology, receiving pecuniary preſents from the regent for his ſervices. He received alſo in 1715 the grant of a penſion of 600 livres, on which occaſion he calculated tables of the moon according to the Newtonian theory, prior to Halley's communications to him, which were printed in 1719. De Liſle was choſen a member of the Academy of Sciences in 1714, on which account his exertions were redoubled.

In 1720 he delivered a propoſal to the academy for aſcertaining in France the figure of the earth, a deſign which was carried into execution ſome years afterwards. In 1723 he delivered to the ſame academy a memoir on the tranſits of Mercury, wherein a method of calculating them was propoſed by him, the way in which they were to be obſerved, and the inferences to be deduced from theſe obſervations. He propoſed the uſe of the quadrant in obſerving the tranſits of Venus and Mercury, which has been found ſuperior to any other inſtrument for that important purpoſe, and is ſanctioned ſince his day by the practice of the ableſt aſtronomers.

Our diſtinguiſhed philoſopher came over to England in the year 1724, where he became acquainted with Newton and Halley, and had the honour of obtaining their approbation. Newton made him a preſent of his own portrait, and Halley gave him a copy of the tables which he had publiſhed in 1719. He was alſo created a member of the Royal Society, and he enjoyed ſimilar honours from every literary ſociety in Europe before his death. In 1721 he received an invitation from Peter the Great to go to Peterſburgh, to fill the chair of aſtronomer in the Imperial Academy of Sciences. On the death of that emperor, his ſucceſſor Catharine renewed the invitation, offering him a conſiderable penſion, of which he accepted, and, in 1726, ſet out for Peterſburgh, accompanied by his brother Lewis and M. Vignon, who were to act as his aſſiſtants. He reached Peterſburgh in the month of October, and was eſtabliſhed in the obſervatory erected by Peter the Great, which he occupied for 21 years. It was in every reſpect commodious, but extremely deficient in aſtronomical apparatus, which his own ingenuity and indefatigable application in a great meaſure ſupplied.

A tranſit of Mercury over the ſun's diſc was expected in the year 1740, which would not be viſible in Europe, and therefore de Liſle undertook a journey to the diſtant regions of Aſia; but after travelling through the inhoſpitable wilds of Siberia, the cloudineſs of the atmoſphere prevented him from obſerving the tranſit,—a mortification which he endeavoured to ſupport by his geographical and phyſical remarks, and in drawing up a deſcription of the country. He conſtructed an intereſting map of Ruſſia, aſſiſted by his brother Lewis, who was appointed to make obſervations in the moſt diſtant parts of that immenſe empire. He was occaſionally employed for the long period of forty years, in making meteorological obſervations, which he executed with an accuracy almoſt incredible.

After a number of diſcouragements and difficulties, and the irregular payment of his penſion, had been long experienced by de Liſle at Peterſburgh, he returned diſguſted to his native place, and was choſen profeſſor of mathematics at the college-royal, where he did the moſt eſſential ſervice to the ſciences, by the important inſtructions which he gave to his numerous pupils, many of whom became afterwards the moſt diſtinguiſhed characters, ſuch as M. M. de la Lande and Meſſier.

When the tranſit of Mercury over the ſun was eagerly expected in 1753 by the greateſt aſtronomers, de Liſle publiſhed an intereſting map of the world, repreſenting the effect of Mercury's parallaxes in different countries, that ſuch places might be known as were proper for making thoſe obſervations on the tranſit as might determine the diſtance of the ſun. As the apparent orbit of the planet traverſed nearly the centre of the ſun, de Liſle made uſe of this circumſtance to determine the diameter of that luminary. The laſt work of our author which was inſerted in the volumes of the French academy, was a memoir on the comet which appeared in the year 1758, diſcovered by a peaſant in the vicinity of Dreſden.

It may perhaps be aſſerted with juſtice, that the moſt important ſervice which this great man rendered to aſtronomers was, his correction of the double error of Halley reſpecting the tranſit of Venus, looked for in the year 1761, as by this means he prevented many learned men from undertaking long voyages in order to obſerve it. About the year 1754, de Liſle was appointed by the king of France, aſtronomical geographer to the marine, in which capacity he was to collect plans and journals of naval captains, to arrange them methodically, and to make extracts from them of whatever might be beneficial to the ſervice. About the year 1758 he withdrew into quiet retirement at the abbey of St Genevieve, where much of his time was ſpent in devotional exerciſes, and in acts of charity and beneficence. Still, however, he continued to proſecute thoſe ſtudies which had been ſo dear to him during the earlier part of his life; but in 1768 he was ſeized with a ſcorbutic complaint, of which he was cured by his medical friends; but in the month of September the ſame year he was ſeized with a ſpecies of apoplexy, which carried him off on the 11th day of that month, in the 81ſt year of his age.

His extraordinary merit as a man of ſcience may in in ſome meaſure be gathered from this conciſe account of his life; and as a citizen of the world his piety was unaffected, his morals pure, his integrity undeviating, his ſpirit generous and diſintereſted, and his whole manners highly amiable. The only publication of our author's, beſides thoſe already mentioned, conſiſted of "Memoirs illuſtrative of the Hiſtory of Aſtronomy," in two volumes 4to.

Lisle, *Sir John*, a brave loyaliſt in the time of the civil wars, was the ſon of a bookſeller in London, and received his education in the Netherlands. He ſignalized himſelf upon many occaſions in the civil war, particularly in the laſt battle of Newbury; where, in the duſk of the evening, he led his men to the charge in his ſhirt, that his perſon might be more conſpicuous. The king, who was an eye-witneſs of his bravery, knighted him on the field of battle. In 1648, he roſe for his majeſty in Eſſex; and was one of the royaliſts who

Liſmore. who ſo obſtinately defended Colcheſter, and who died for the defence of it. This brave man having tenderly embraced the corpſe of Sir Charles Lucas, his departed friend, immediately preſented himſelf to the ſoldiers who ſtood ready for his execution. Thinking that they ſtood at too great a diſtance, he deſired them to come nearer: one of them ſaid, "I warrant you, Sir, we ſhall hit you." He replied with a ſmile, "Friends, I have been nearer you when you have miſſed me." He was executed Auguſt 28. 1648.

LISMORE, one of the Weſtern iſlands of Scotland, ſeated at the mouth of Loch Linnhe, an arm of the ſea in Argyleſhire, navigable for the largeſt ſhips to Fort William, which is in the country called Lochaber. This iſland is 10 miles in length by one in breadth; and contains above 1000 inhabitants. It abounds in limeſtone, which forms a fine loamy and very fertile ſoil, yielding rich crops of barley. This iſland was formerly the reſidence of the biſhop of Argyle, from which he was frequently named *Epiſcopus Liſmorenſis*. Great part of the cathedral yet remains, and part of it is ſtill employed as the pariſh church. The biſhop's caſtle ſtands four miles from the cathedral; the walls are yet pretty entire. There are ſome veſtiges of fortified camps, and an old caſtle with a ditch and drawbridge, which, it is ſaid, were erected by the Danes.

LISMORE, a borough town of Ireland, in the county of Waterford, and province of Munſter, 100 miles from Dublin; N. Lat. 52. 5. W. Long. 7. 50. It was anciently called *Leſſmore* or *Lios-more*, i. e. the great encloſure, or habitation; it is now a biſhopric, and formerly had an univerſity. St Carthagh or Mochuda, in the beginning of the ſeventh century, founded an abbey and ſchool in this place, which in a ſhort time was much reſorted to, not only by the natives, but alſo by the Britons and Saxons, during the middle ages. According to an ancient writer of the life of St Carthagh, Liſmore was in general inhabited by monks, half of it being an aſylum into which no woman dared enter; conſiſting entirely of cells and monaſteries, the ruins of which, with ſeven churches, are yet viſible. A caſtle was built here by King John. The ſite of Liſmore was in early ages denominated *magh ſkia*, or the "choſen ſhield," being the ſituation of a dun or fort of the ancient chieftans of the Decies, one of whom granted it to St Carthagh on his expulſion from the abbey of Ratheny in Weſtmeath. On becoming an univerſity, Math Sgiath obtained the name of *Dunſginne*, or the "fort of the Saxons," from the number of Saxons who reſorted thereto: but ſoon after, it was called *Lios-more* or *Leſs-more*, and now *Liſmore;* the biſhopric of which was united to that of Waterford in 1363, being 730 years after its foundation. The public road to Cork was formerly through this place, and at that time it had a better face of buſineſs. St Carthagh, who retired to this place with ſome of his religious in 636, to avoid the fury of the then Iriſh monarch, tied his diſciples to a moſt ſtrict rule of life; they never were allowed the uſe of fleſh, fiſh, or fowl; only the vegetables that the ground produced at the expence of their own labour. Father Daniel, in his *Hiſtoire Monaſtique*, mentions one on the ſame foundation in France. The caſtle here, which, as we have formerly mentioned, was built by King John, was erected in 1195 on the ruins of the abbey of St Carthagh: it belonged to the duke of Devonſhire, and gave birth to the great philoſopher Robert Boyle. In 1189 it was demoliſhed by the Iriſh, who took it by ſurpriſe. Being afterwards re-edified, it was for many years an epiſcopal reſidence, till Myler Magrath, archbiſhop of Caſhel, and biſhop of this ſee, granted the manor of Liſmore to that noted ſcholar and ſoldier Sir Walter Raleigh, in the reign of Queen Elizabeth, at the yearly rent of 13l. 6s. 8d.; but that eſtate was lopped off with his head in the reign of King James I. After which it fell into the hands of Sir Richard Boyle, who purchaſed all Sir Walter's lands; he beautified the whole, and added many buildings to it, moſt of which were burned down in the Iriſh rebellion; at the breaking out of which, it was cloſely beſieged by 5000 Iriſh commanded by Sir Richard Beling, and was well defended by the young Lord Broghill, third ſon of the earl of Cork, who obliged them to raiſe the ſiege. The caſtle is boldly ſeated on the verge of a rocky hill, riſing almoſt perpendicularly to a conſiderable height over the river Blackwater. The entrance is by an ancient and venerable avenue of trees. Over the gate are the venerable arms of the firſt earl of Cork. Oppoſite to the entrance is a modern portico of Bath ſtone, of the Doric order, deſigned by Inigo Jones. Moſt of the buildings have remained in ruins ſince the era of the rebellion; but the ſeveral offices that make up two ſides of the ſquare are kept in repair. At each angle is a tower, the chief remains of its former magnificence. In October 1785, the late duke of Rutland, then lord lieutenant of Ireland, whilſt on a tour in Munſter, held a council in, and iſſued proclamations from this caſtle. The cathedral is ſtill pretty well kept in repair. Here is a fine bridge over the river Blackwater, erected at a very great expence by the duke of Devonſhire: this bridge is remarkable for the extent of the principal arch, the ſpan of it being 102 feet. Below the town is a rich fiſhery for ſalmon, which is the greateſt branch of trade here. Though this place is at preſent much reduced, yet Cambrenſis informs us, that, not many years after the conqueſt, this was a very rich city, and held out ſome time againſt the Engliſh, who took it at laſt by ſtorm, and gained rich plunder here, enough to load 16 ſail of ſhips. Liſmore ‖ Liſt.

LISSA, an iſland in the gulf of Venice, on the coaſt of Dalmatia, belonging to the Venetians, where they have a fiſhery of ſardines and anchovies. It produces excellent wine, and is 70 miles weſt of Raguſa. E. Long. 17. 0. N. Lat. 43. 22.

LISSA, a town of Poland, in the palatinate of Poſna, of which it is the capital. E. Long. 16. 0. N. Lat. 32. 15.

LISSA, a village of Sileſia, 16 miles from Breſlau, remarkable for a battle fought between the Pruſſians and the Auſtrians on the 15th of December 1757, when the latter were entirely defeated.

LISSUS, in *Ancient Geography*, the laſt town of Illyricum, towards Macedonia, ſituated on the Drilo. It had a capacious port, the work of Dionyſius the Tyrant, who led the colony thither, enlarged and walled it round, (Diodorus Siculus.) Now called *Aleſſio*, in Albania, on the Drino, near the gulf of Venice. E. Long. 20. N. Lat. 42.

LIST, in commerce, the border of cloth or ſtuff;

ſerving not only to ſhow their quality, but to preſerve them from being torn in the operations of fulling, dying, &c.—Liſt is uſed on various occaſions; but chiefly by gardeners for ſecuring their wall trees.

Liſt, in *Architecture*, a little ſquare moulding, otherwiſe called a *fillet*, *liſtel*, &c. See Architecture.

List, is alſo uſed, to ſignify the encloſed field or ground wherein the ancient knights held their juſts and combats. It was ſo called, as being hemmed round with pales, barriers, or ſtakes, as with a liſt. Some of theſe were double, one for each cavalier; which kept them apart, ſo that they could not come nearer each other than a ſpear's length. See Just, Tournament, Duel, &c.

Civil List, in the Britiſh polity. The expences defrayed by the civil liſt are thoſe that in any ſhape relate to civil government; as, the expences of the houſehold; all ſalaries to officers of ſtate, to the judges, and every one of the king's ſervants, the appointments to foreign ambaſſadors; the maintenance of the queen and royal family; the king's private expences, or privy-purſe; and other very numerous outgoings, as ſecret-ſervice money, penſions, and other bounties: which ſometimes have ſo far exceeded the revenues appointed for that purpoſe, that application has been made to parliament to diſcharge the debts contracted on the civil liſt; as particularly in 1724, when one million was granted for that purpoſe by the ſtatute 11 Geo. I. c. 17. and, in 1769, when half a million was appropriated to the like uſes by the ſtatute 9 Geo. III. c. 34.

Blackſt. Comment.

The civil liſt is indeed properly the whole of the king's revenue in his own diſtinct capacity; the reſt being rather the revenue of the public, or its creditors, though collected and diſtributed again in the name and by the officers of the crown: it now ſtanding in the ſame place, as the hereditary income did formerly; and as that has gradually diminiſhed, the parliamentary appointments have increaſed. The whole revenue of Queen Elizabeth did not amount to more than 600,000l. a-year: that of King Charles I. was 800,000l. and the revenue voted for King Charles II. was 1,200,000l. though complaints were made (in the firſt years at leaſt) that it did not amount to ſo much. But it muſt be obſerved, that under theſe ſums were included all manner of public expences; among which Lord Clarendon, in his ſpeech to the parliament, computed that the charge of the navy and land forces amounted annually to 800,000l. which was ten times more than before the former troubles. The ſame revenue, ſubject to the ſame charges, was ſettled on King James II.: but by the increaſe of trade, and more frugal management, it amounted on an average to 1,500,000l. per annum, (beſides other additional cuſtoms granted by parliament, which produced an annual revenue of 400,000l.), out of which his fleet and army were maintained at the yearly expence of 1,100,000l. After the Revolution, when the parliament took into its own hands the annual ſupport of the forces both maritime and military, a civil liſt revenue was ſettled on the new king and queen, amounting, with the hereditary duties, to 700,000l. per annum; and the ſame was continued to Queen Anne and King George I. That of King George II. was nominally augmented to 800,000l.*, and in fact was conſiderably more: but that of his preſent majeſty is expreſsly limited to that ſum; though 100,000l. hath been ſince added. And upon the whole, it is doubtleſs much better for the crown, and alſo for the people, to have the revenue ſettled upon the modern footing rather than the ancient. For the crown, becauſe it is more certain, and collected with greater eaſe; for the people, becauſe they are now delivered from the feudal hardſhips, and other odious branches of the prerogative. And though complaints have ſometimes been made of the increaſe of the civil liſt, yet if we conſider the ſums that have been formerly granted, the limited extent under which it is now eſtabliſhed, the revenues and prerogatives given up in lieu of it by the crown, the numerous branches of the preſent royal family, and (above all) the diminution of the value of money compared with what it was worth in the laſt century, we muſt acknowledge theſe complaints to be void of any rational foundation; and that it is impoſſible to ſupport that dignity, which a king of Great Britain ſhould maintain, with an income in any degree leſs than what is now eſtabliſhed by parliament. See Revenue.

* See Revenue.

To List or Enliſt Soldiers, to retain and enroll men as ſoldiers, either as volunteers, or by a kind of compulſion. Perſons liſted muſt be carried within four days, but not ſooner than 24 hours after, before the next juſtice of peace of any county, riding, city, or place, or chief magiſtrate of any city or town corporate (not being an officer in the army); and if before ſuch juſtice or magiſtrate they diſſent from ſuch enliſting, and return the enliſting money, and alſo 20 ſhillings in lieu of all charges expended on them, they are to be diſcharged. But perſons refuſing or neglecting to return and pay ſuch money within 24 hours, ſhall be deemed as duly liſted as if they had aſſented thereto before the proper magiſtrate; and they ſhall, in that caſe, be obliged to take the oath, or, upon refuſal, they ſhall be confined by the officer who liſted them till they do take it.

LISTER, Dr Martin, an eminent Engliſh phyſician and naturaliſt, was born in 1638, and educated at Cambridge. He afterwards travelled into France; and at his return practiſed phyſic at York, and afterwards at London. In 1683 he was created doctor of phyſic, and became fellow of the College of Phyſicians in London. In 1698, he attended the earl of Portland in his embaſſy from King William III. to the court of France; of which journey he publiſhed an account at his return, and was afterwards phyſician to Queen Anne. He alſo publiſhed, 1. *Hiſtoria animalium Angliæ*, quarto. 2. *Conchyliorum ſynopſis*, folio. 3. *Cochlearum et limacum exercitatio anatomica*, 4 vols. 8vo. 4. Many pieces in the Philoſophical Tranſactions; and other works.

LISTOWEL, a pariſh, alſo a poſt and fair town, of Ireland, in the county of Kerry and province of Munſter, 131 miles from Dublin, anciently *Lis Tuathal*, i. e. "the fort of Tuathal," who was exiled in the 1ſt century, but returned; and his life forms a brilliant era in Iriſh hiſtory. Near this are the ruins of a caſtle, pleaſantly ſituated on the river Feale: it was taken in November 1600, by Sir Charles Wilmot, being then held out for Lord Kerry againſt Queen Elizabeth. Five miles beyond Liſtowel are the ruins of a church. The fairs are three in the year.

LITANA Silva, in *Ancient Geography*, a wood of the Boii, in Gallia Togata, or Ciſpadana, where the Romans, under L. Poſthumius Albinus (whoſe head the Boii cut off, and carried in triumph into their moſt ſacred temple), had a great defeat; of twenty-five thouſand ſcarcely ten eſcaping (Livy). Holſtenius conjectures, that this happened above the ſprings of the Scultenna, in a part of the Appennine, between Cerſinianum and Matina. Now Selva di Lugo.

LITANY, a ſolemn form of ſupplication to God, in which the prieſt utters ſome things fit to be prayed for, and the people join in their interceſſion, ſaying, *we beſeech thee to hear us, good Lord*, &c. The word comes from the Greek λιτανεια, "ſupplication;" of λιτανευω, "I beſeech."

At firſt the uſe of litanies was not fixed to any ſtated time, but were only employed as exigencies required. They were obſerved, in imitation of the Ninevites, with ardent ſupplications and faſtings, to avert the threatening judgements of fire, earthquakes, inundations, or hoſtile invaſions. About the year 400, litanies began to be uſed in proceſſions, the people walking barefoot, and repeating them with great devotion; and it is pretended, that by this means ſeveral countries were delivered from great calamities. The days on which theſe were uſed were called *rogation days*: theſe were appointed by the canons of different councils, till it was decreed by the council of Toledo, that they ſhould be uſed every month throughout the year; and thus by degrees they came to be uſed weekly on Wedneſdays and Fridays, the ancient ſtationary days for faſting. To theſe days the rubric of our church has added Sundays, as being the greateſt days for aſſembling at divine ſervice. Before the laſt review of the common prayer, the litany was a diſtinct ſervice by itſelf, and uſed ſome time after the morning prayer was over: at preſent it is made one office with the morning ſervice, being ordered to be read after the third collect for grace, inſtead of the interceſſional prayers in the daily ſervice.

LITCHFIELD, a city of Staffordſhire, in England, 117 miles from London. It ſtands low, about three miles from the Trent: and its ancient name is ſaid to have been *Licidfield*, ſignifying, "a field of carcaſſes," from a great number of Chriſtians having, as it is pretended, ſuffered martyrdom here in the perſecution under Diocleſian. In the Saxons time, it was a biſhoprick for a ſhort ſpace; and is now, together with Coventry, a biſhoprick. It is divided into two parts by a rivulet and a kind of ſhallow lake, over which are two cauſeways with ſluices. It is a long ſtraggling place; but has ſome very handſome houſes, and well paved clean ſtreets. That part on the ſouth ſide of the rivulet is called the *city*, and the other the *cloſe*. The *city* is much the largeſt, and contains ſeveral public ſtructures. It was incorporated by Edw. VI. with the name of bailiffs and burgeſſes; and is both a town and county, governed by 2 bailiffs choſen yearly out of 24 burgeſſes, a recorder, a ſheriff, a ſteward, and other officers. The city has power of life and death within their juriſdiction, a court of record, and a piepowder court. Here is a gaol both for debtors and felons, a free ſchool, and a pretty large well endowed hoſpital, for a maſter and 12 brethren. The county of the city is 10 or 12 miles in compaſs, which the ſheriff rides yearly on the 8th of September, and then feaſts the corporation and neighbouring gentry. The cloſe is ſo called from its being encloſed with a wall and a deep dry ditch on all ſides except towards the city, where it is defended by a great lake or marſh formed by its brook. The cathedral, which ſtands in the cloſe, was originally built by Oſwius king of Northumberland about 300. It was rebuilt and enlarged by Offa king of Mercia in 766. In 1148 was rebuilt, and greatly enlarged in 1296. At the reformation, Coventry was divided from it. In the civil wars its ſpire was deſtroyed, and it converted to a ſtable. In 1776 a beautiful painted window, by the benefaction of Dr Adenbrook, has been ſet up at the weſtern end of the cathedral. In the civil wars it was ſeveral times taken and retaken, and thereby ſuffered much; but was ſo repaired after the reſtoration, at the expence of 20,000l. that it was one of the faireſt and nobleſt ſtructures of the kind in England. It is walled in like a caſtle, and ſtands ſo high as to be ſeen 10 miles round. It is 450 feet long, of which the choir is 110, and the breadth in the broadeſt place 80. Its portico is hardly to be paralleled in England. There were, till lately, 26 ſtatues of the prophets, apoſtles, kings of Judah, and ſome kings of this land, in a row above it, as big as the life; and on the top, at each corner of the portico, is a ſtately ſpire, beſides a fine high ſteeple on the middle of the church. The choir is paved in great part with alabaſter and cannel coal, in imitation of black and white marble. In 1789 it underwent a general repair, when the maſſive groined arch betwixt the weſt end of the church and the tranſept, which had forced the ſide wall out of its perpendicular, was removed. The prebendaries ſtalls, which are thought to be the beſt in England, were moſt of them re-erected at the charge of the country gentlemen, whoſe names and arms are painted at the top of the ſtalls. The north door is extremely rich in ſculpture, but much injured by time. The body which is ſupported by pillars formed of numbers of ſlender columns, has lately had its decayed leaden roof replaced by a neat ſlated covering. The choir merits attention on account of the elegant ſculpture about the windows, and the embattled gallery that runs beneath them; to which the altarpiece of Grecian architecture but ill correſponds; behind which is Mary's chapel, divided from it by a moſt elegant ſtone ſkreen of beautiful workmanſhip. Here ſtood St Chad's ſhrine, which coſt 2000l. The charter houſe is an octagon room. In the ſame cloſe are the palaces of the biſhop and dean, and the prebendaries houſes in a court on the hill. Here are three other churches; one of which, St Michael's, has a churchyard of 6 or 7 acres. There was a caſtle here, long ſince deſtroyed: and ancient camps have been diſcovered in its environs. In the neighbourhood are frequent horſe races. The markets there are on Tueſday and Friday, and ſix fairs in the year. By the late inland navigation, this place has communication with the rivers Merſey, Dee, Ribble, Ouſe, Trent, Darwent, Severn, Humber, Thames, Avon, &c. which navigation, including its windings, extends above 500 miles in the counties of Lincoln, Nottingham, York, Lancaſter, Weſtmoreland, Cheſter, Warwick, Leiceſter, Oxford, Worceſter, &c. Litchfield ſends two members to parliament.

LITERARY, any thing belonging to **LITERATURE**.

Literary Property, or *Copy Right*. See *Copy Right*.

LITERATI (*letrados*, "lettered"), an epithet given to ſuch perſons among the Chineſe as are able to read and write their language. The literati alone are capable of being made mandarins.

LITERATI, is alſo the name of a particular ſect, either in religion, philoſophy, or politics, conſiſting principally of the learned men of that country; among whom it is called *jukiao*, i. e. "learned."

It had its riſe in the year of Chriſt 1400, when the emperor, to awaken the native affection of the people for knowledge, which had been quite baniſhed by the preceding civil wars among them, and to ſtir up emulation among the mandarins, choſe out 42 of the ableſt among their doctors, to whom he gave a commiſſion to compoſe a body of doctrine agreeable to that of the ancients, which was then become the rule or ſtandard of the learned. The delegates applied themſelves to the buſineſs with very great attention: but ſome fancied them rather to have wreſted the doctrine of the ancients, to make it conſiſt with theirs, than to have built up theirs on the model of the ancients.

They ſpeak of the Deity, as if it were no more than mere nature or the natural power or virtue that produces, diſpoſes, and preſerves, the ſeveral parts of the univerſe. It is, ſay they, a pure, perfect principle, without beginning or end; it is the ſource of all things, the eſſence of every being, and that which determines it to be what it is. They make God the ſoul of the world: they ſay, he is diffuſed through all matter, and produces all the changes that happen there. In ſhort, it is not eaſy to determine, whether they reſolve God into nature, or lift up nature into God; for they aſcribe to it many of thoſe things which we attribute to God.

This doctrine, in lieu of the idolatry that prevailed before, introduced a refined kind of atheiſm. The work, being compoſed by ſo many perſons of learning and parts, and approved by the emperor himſelf, was received with infinite applauſe by all the people. Many were pleaſed with it, becauſe it ſeemed to ſubvert all religion; others approved it, becauſe the little religion that it left them could not give them much trouble. And thus was formed the ſect of the Literati: which conſiſts of the maintainers and adherents to this doctrine.

The court, the mandarins, and the perſons of fortune and quality, &c. are generally retainers to it; but a great part of the common people ſtill hold to their worſhip of idols.

The literati freely tolerate the Mahometans, becauſe they adore, with them, the King of heaven, and Author of nature; but they bear a perfect averſion to all ſorts of idolaters among them: and it was once reſolved to extirpate them. But the diſorder this would have occaſioned in the empire prevented it; they now content themſelves with condemning them, in general, as hereſies; which they do ſolemnly every year at Pekin.

LITERATURE denotes learning or ſkill in letters.

LITERNUM. See **LINTERNUM.**

LITHANTHRAX, or *Pit-Coal*, is a black or brown, laminated, bituminous ſubſtance; not very eaſily inflammable, but, when once inflamed, burns longer and more intenſely than any other ſubſtance. See **MINERALOGY** *Index*.

LITHARGE, a preparation of lead, uſually in form of ſoft flakes, of a yellowiſh reddiſh colour. If calcined lead be urged with a haſty fire, it melts into the appearance of oil, and on cooling concretes into litharge. Greateſt part of the litharge met with in the ſhops is produced in the purification of ſilver from lead, and the refining of gold and ſilver by means of this metal: according to the degree of fire and other circumſtances, it proves of a pale or deep colour: the firſt has been commonly called *litharge of ſilver*, the other *litharge of gold*. See **LEAD**, **CHEMISTRY** *Index*.

LITHGOW, WILLIAM, a Scotſman, whoſe ſufferings by impriſonment and torture at Malaga, and whoſe travels, on foot, over Europe, Aſia, and Africa, ſeem to raiſe him almoſt to the rank of a martyr and a hero, publiſhed an account of his peregrinations and adventures. Though the author deals much in the marvellous, the horrid account of the ſtrange cruelties of which, he tells us, he was the ſubject, have, however, an air of truth. Soon after his arrival in England from Malaga, he was carried to Theobald's on a feather-bed, that King James might be an eyewitneſs of his *martyred anatomy*, by which he means his wretched body, mangled and reduced to a ſkeleton. The whole court crowded to ſee him; and his majeſty ordered him to be taken care of, and he was twice ſent to Bath at his expence. By the king's command he applied to Gondamor, the Spaniſh ambaſſador, for the recovery of the money and other things of value which the governor of Malaga had taken from him, and for 1000l. for his ſupport. He was promiſed a full reparation for the damage he had ſuſtained: but the perfidious miniſter never performed his promiſe. When he was upon the point of leaving England, Lithgow upbraided him with the breach of his word in the preſence-chamber, before ſeveral gentlemen of the court. This occaſioned their fighting upon the ſpot; and the ambaſſador, as the traveller oddly expreſſes it, had his fiſtula (with which diſorder he was afflicted) contrabanded with his fiſt. The unfortunate Lithgow, who was generally condemned for his ſpirited behaviour, was ſent to the Marſhalſea, where he continued a priſoner nine months. At the concluſion of the octavo edition of his *Travels* he informs us, that, in his three voyages, "his painful feet have traced over (beſides paſſages of ſeas and rivers) 36,000 and odd miles, which draweth near to twice the circumference of the whole earth." Here the marvellous ſeems to riſe to the incredible; and to ſet him, in point of veracity, below Coryat, whom it is nevertheleſs certain that he far outwalked. His deſcription of Ireland is whimſical and curious. This, together with the narrative of his ſufferings, is reprinted in Morgan's *Phœnix Britannicus*.

LITHIASIS, or **STONE**. See **MEDICINE** *Index*.

LITHOMANTIA, in antiquity, a ſpecies of divination performed with ſtones. Sometimes the ſtone called *ſiderites* was uſed: this they waſhed in ſpring-water in the night by candle-light; the perſon that conſulted it was to be purified from all manner of pollution, and to have his face covered: this done, he repeated divine prayers, and placed certain characters in an appointed order; and then the ſtone moved of itſelf, and in a ſoft gentle murmur, or (as ſome ſay) in a voice like that of a child, returned an anſwer. By a ſtone of this nature, Helenus is reported to have foretold the deſtruction of Troy.

LITHONTRIPTICS (from λιθος "a ſtone," and θρυπτω "to break"); an epithet for medicines that are ſuppoſed to break the ſtone in the bladder. Though the different ſtones that are generated in the human bladder require different ſolvents when out of the body; and though art hath not yet afforded a medicine which, when injected into the bladder, will, without injury thereto, diſſolve the ſtone therein lodged; it cannot thence be concluded, that there are no lithontriptic medicines. It may be here obſerved, that one ſolvent affects one ſubject, but hath no effect on another; ſo a ſolvent may yet be met with that will deſtroy the ſtone, and not hurt the human body. The water into which the boiled white of egg diſſolves will liquefy myrrh, but may be put into the human eye without cauſing any uneaſineſs.

Soap ley taken at firſt in ſmall doſes in broth that is freed from all its fat, ſucceeds in moſt caſes which require an alkaline ſolvent. The patient may begin with 20 drops, and gradually increaſe the doſe as he is able; and by repeating it three times a-day for ſix, eight, or twelve months, the wiſhed-for effects often follow.

LITHOPHYTA, the name of Linnæus's third order of vermes. See HELMINTHOLOGY *Index*.

LITHOSPERMUM, GROMWELL, a genus of plants belonging to the pentandria claſs; and in the natural method ranking under the 41ſt order, *Aſperifoliæ*. See BOTANY *Index*.

LITHOSTROTON, among the Romans, was a pavement of moſaic work, conſiſting of ſmall pieces of cut marble of different kinds and colours, firſt uſed in the time of Sylla, who made one at Præneſte in the temple of Fortune, and afterwards in private houſes; and were brought to ſuch perfection, that they exhibited moſt lively repreſentations of nature, with all the accuracy of the fineſt painting.

LITHOTOMY, in *Surgery*, the operation of cutting for the ſtone. See SURGERY *Index*.

LITHUANIA, an extenſive province of Poland. By the natives it is called *Letwa*, and has Great Poland and Ruſſia on the weſt; part of Muſcovy on the eaſt; Livonia, the Baltic ſea, and part of Muſcovy, on the north; Red Ruſſia, Volhinia, and Podolia, on the ſouth; and the Ukraine on the ſouth-eaſt. Its length is ſaid to be about 360, and its breadth 340 miles; but it is much indented both ways. Lithuania was anciently overrun with wood; and there are ſtill many foreſts in it, which yield a great deal of honey, wax, pitch, tar, and timber; and abound with wild boars, buffaloes, elks, wild horſes, wild aſſes, uri, and woodcocks. The lakes are alſo numerous, and well ſtored with fiſh: but the air, by reaſon of theſe foreſts and lakes, is ſaid to be thick and foggy. The country produces a great deal of buck wheat and other corn; the paſtures are luxuriant, and the flocks and herds numerous: ſo that, notwithſtanding agriculture is much neglected, but proviſions are exceeding cheap, and money ſo ſcarce, that 10 per cent. is the common intereſt. The principal nobility have large eſtates, and live in great pomp and ſplendour, generally retaining ſome hundreds of thoſe that are poor, in quality of domeſtics. The eſtabliſhed religion is Popery; but Lutherans, Calviniſts, Jews, Turks, Greeks, and Socinians, are very numerous. Lithuania was governed by its own dukes till it was united to Poland, towards the end of the 14th century, when the great duke Jagello married Hedwig, the dowager of Louis king of Poland and Hungary. It had even dukes after that, but they were ſubordinate to the king; and at this day, though one diet ſerves for both countries, yet each has its peculiar laws, cuſtoms, dialect, and privileges. In a diet held at Lublin in 1569, it was more cloſely united to Poland than it had been before; and it was enacted, that both countries, for the future, ſhould form but one ſtate under the ſame prince. As to their courts of juſtice, the tenth part of what is adjudged in all real actions goes always to the judge's box, and is immediately paid in court; and in perſonal actions he claims half the damages given. A nobleman is only fined for murder, as in Poland. The dialect is a language of the Sclavonic; and they ſpeak here, as in Poland, a barbarous kind of Latin. Lithuania is divided into nine palatinates. Another diviſion is into Lithuania properly ſo called, and Lithuanian Ruſſia. Some alſo comprehend under it Samogitia and Courland, which is a fief of Poland.

LITMUS, or LACMUS, in the arts, is a blue pigment, formed from *archil*. It is brought from Holland at a cheap rate; but may be prepared by adding quicklime and putrified urine, or ſpirit of urine diſtilled from lime, to the archil previouſly bruiſed by grinding. The mixture having cooled, and the fluid ſuffered to evaporate, becomes a maſs of the conſiſtence of a paſte, which is laid on boards to dry in ſquare lumps. It is only uſed in miniature paintings, and cannot be well depended on, becauſe the leaſt approach of acid changes it inſtantly from blue to red. The beſt litmus is very apt to change and fly.

LITTER (*lectica*), a kind of vehicle borne upon ſhafts; anciently eſteemed the moſt eaſy and genteel way of carriage. Du Cange derives the word from the barbarous Latin *lecteria* "ſtraw or bedding for beaſts." Others will rather have it come from *lectus* "bed;" there being ordinarily a quilt and a pillow to a litter in the ſame manner as to a bed.

Pliny calls the litter the *traveller's chamber*; it was much in uſe among the Romans, among whom it was borne by ſlaves kept for that purpoſe; as it ſtill continues to be in the eaſt, where it is called a *palanquin*.—The Roman lectica, made to be borne by four men, was called *tetraphorum*; that borne by ſix *hexaphorum*; and that borne by eight *octaphorum*.

The invention of litters, according to Cicero, was owing to the kings of Bithynia: in the time of Tiberius they were become very frequent at Rome, as appears from Seneca; and even ſlaves themſelves were borne in them, though never by more than two perſons, whereas men of quality had ſix or eight.

LITTER alſo denotes a parcel of dry old ſtraw put on the floor of a horſe's ſtall for him to lie down and reſt upon. When a horſe comes tired into a ſtable, freſh litter has the virtue of making him ſtale immediately. This is known to be a very great advantage to a horſe in a tired ſtate: and when the litter is old and dirty, it never has any ſuch effect upon him. If the owners knew how refreſhing it is for a horſe to diſcharge his urine on his return from labour, they would be more careful of giving them all means and occaſions of it than they are. This ſtaling after fatigue prevents thoſe obſtructions in the neck of the bladder or urinary paſſages which horſes are too ſubject to.

LITTLETON, Sir Thomas, judge of the common pleas, was the eldeſt ſon of Thomas Weſtcote, Eſq. of the county of Devon, by Elizabeth, ſole heireſs of Thomas Littleton of Frankley in Worceſterſhire, at whoſe requeſt he took the name and arms of that family. He was educated at one of our univerſities, probably at Cambridge. Thence he removed to the Inner Temple, where he became one of the readers; and was afterwards, by Henry VI. made ſteward or judge of the court of the palace, or marſhalſea of the king's houſehold. In 1455, the thirty-third of that reign, he was appointed king's ſerjeant, and rode the northern circuit as judge of aſſize. In 1462, the ſecond of Edward IV, he obtained a pardon from the crown; and, in 1466, was appointed one of the judges of the common pleas, and rode the Northamptonſhire circuit. In the year 1474 he was, with many of the firſt nobility, created knight of the Bath. He died in 1481; and was buried in the cathedral church of Worceſter, where a marble tomb, with his ſtatue upon it, was erected to his memory. As to his character as a lawyer, it is ſufficient to inform the reader, that he was the author of the Treatiſe upon Tenures, on which Sir Edward Coke wrote a comment, well known by the title of *Coke upon Littleton*.

Littleton, *Adam*, deſcended from an ancient family in Shropſhire, was born in 1627, educated at Weſtminſter ſchool, and went to Oxford a ſtudent of Chriſt-church, whence he was ejected by the parliament viſitors in 1648. Soon after, he became uſher of Weſtminſter ſchool, and in 1658 was made ſecond maſter of Weſtminſter ſchool. After the reſtoration he taught a ſchool at Chelſea in Middleſex, of which church he was admitted rector in the year 1664. In 1670 he accumulated the degrees in divinity, being then chaplain in ordinary to his majeſty. In 1674, he became prebendary of Weſtminſter, of which church he was afterwards ſub-dean. Beſide the well-known *Latin* and *Engliſh* Dictionary, he publiſhed ſeveral other works. He died in 1694, and was interred at Chelſea. He was an univerſal ſcholar; and extremely charitable, humane, and eaſy of acceſs.

LITURGY, denotes all the ceremonies in general belonging to divine ſervice.

The word comes from the Greek λειτουργια "ſervice, public miniſtry;" formed of λειτος "public," and εργον "work."

In a more reſtrained ſignification, liturgy is uſed among the Romaniſts to ſignify the *maſs*; and among us the *common prayer*.

All who have written on liturgies agree, that in the primitive days divine ſervice was exceedingly ſimple, only clogged with a very few ceremonies, and conſiſting of but a ſmall number of prayers; but, by degrees, they increaſed the number of external ceremonies, and added new prayers, to make the office look more awful and venerable to the people. At length things were carried to ſuch a pitch, that a regulation became neceſſary; and it was found proper to put the ſervice, and the manner of performing it, into writing; and this was what they called a *liturgy*.

Liturgies have been different at different times, and in different countries. We have the liturgy of St Chryſoſtom, that of St Peter, of St James, the liturgy of St Baſil, the Armenian liturgy, the liturgy of the Maronites, of the Cophtæ, the Roman liturgy, the Gallican liturgy, the Engliſh liturgy, the Ambroſian liturgy, the Spaniſh and African liturgies, &c.

In the more early ages of the church, every biſhop had a power to form a liturgy for his own dioceſe; and if he kept to the analogy of faith and doctrine, all circumſtances were left to his own diſcretion. Afterwards the practice was for the whole province to follow the metropolitan church, which alſo became the general rule of the church: and this Lindwood acknowledges to be the common law of the church; intimating, that the uſe of ſeveral ſervices in the ſame province, which was the caſe in England, was not to be warranted but by long cuſtom. The liturgy of the church of England was compoſed in the year 1547, and eſtabliſhed in the ſecond year of King Edward VI. ſtat. 2. and 3. Ed. VI. cap. 1.

In the fifth year of this king it was reviewed; becauſe ſome things were contained in that liturgy which ſhowed a compliance with the ſuperſtition of thoſe times, and ſome exceptions were taken againſt it by ſome learned men at home, and by Calvin abroad. Some alterations were made in it, which conſiſted in adding the general confeſſion and abſolution, and the communion to begin with the ten commandments. The uſe of oil in confirmation and extreme unction was left out, and alſo prayers for ſouls departed, and what tended to a belief of Chriſt's real preſence in the euchariſt. This liturgy, ſo reformed, was eſtabliſhed by the act of 5 and 6 Ed. VI. cap. 1. However, it was aboliſhed by Queen Mary, who enacted, that the ſervice ſhould ſtand as it was moſt commonly uſed in the laſt year of the reign of King Henry VIII. The liturgy of 5 and 6 Ed. VI. was re-eſtabliſhed with ſome few alterations and additions, by 1 Eliz. cap. 2. Some farther alterations were introduced, in conſequence of the review of the common-prayer book, by order of King James, in the firſt year of his reign; particularly in the office of private baptiſm, in ſeveral rubricks and other paſſages, with the addition of five or ſix new prayers and thankſgivings, and all that part of the catechiſm which contains the doctrine of the ſacraments. The book of common-prayer, ſo altered, remained in force from the firſt year of King James to the fourteenth of Charles II. But the laſt review of the liturgy was in the year 1661, and the laſt act of uniformity enjoining the obſervance of it is 13 and 14 Car. II. cap. 4. See *Common-Prayer*. Many applications have been ſince made for a review, but hitherto without ſucceſs.

LITUUS, among the Romans, was the ſtaff made uſe of by the augurs in quartering the heavens. It bore a great reſemblance to the crozier of a biſhop, but was ſhorter. It was crooked at one end, and thickeſt in

Lituus ‖ Liver.

in the curved part, according to A. Gellius. We frequently meet with a repreſentation of it upon medals, amongſt other pontifical inſtruments. It was called *Lituus Quirinalis*; from Quirinus, a name of Romulus, who was ſkilled in all the myſteries of augury.

Lituus, was alſo an inſtrument of muſic in uſe in the Roman army. It was ſtraight, excepting that it had a little bending at the upper end like a lituus or ſacred ſtaff of the augurs; and from the ſimilitude it derived its name.

LIVADIA, anciently *Achaia* and *Hellas*, or *Greece* properly ſo called; a province of Turkey in Europe, bounded on the north by Epirus and Theſſaly, from which it is ſeparated by Mount Oëta, now Banina, and by the Euripus, now the ſtrait of Negropont; on the eaſt, by the Archipelago; on the ſouth, by the gulf of Engia or Egina, the iſthmus of Corinth, and the gulf of Lepanto; and on the weſt, by the Ionian ſea and part of Epirus. Its extent is about 130 miles from north-weſt to ſouth-eaſt; but its greateſt breadth is not above 36 miles. It is in general a mountainous country; but neither unpleaſant nor unfruitful. The principal mountains are, Mount Oëta in Bœotia, where is the famous paſs of Thermopylæ, not above 25 feet broad; and Parnaſſus, Helicon, and Cythæron in Phocis, which were ſacred to Apollo and the muſes, and conſequently much celebrated by the poets. The rivers of moſt note are, the Sionapro, anciently the Achelous, the Cephiſſus, the Iſmenus, and the Aſopus. The province is at preſent divided into Livadia proper, Stramulippa, and the duchy of Athens. The principal places are, Lepanto, anciently Naupactus; Livadia, anciently Libadia or Lebadia; the celebrated city of Athens, now Setines; Thebes, now Stibes; Lepſina, anciently Eleuſis; Caſtri, formerly Delphi; and Megara.

Livadia, an ancient town of Turkey in Europe, and capital of a province of the ſame name in Greece. It is a large and populous place, ſeated on the gulf of Lepanto, about 25 miles from the city of that name. It has now a conſiderable trade in woollen ſtuffs and rice. Anciently it was celebrated for the oracle of Trophonius, which was in a cavern in a hill above the town. E. Long. 23. 29. N. Lat. 38. 40.

LIVER, ſee Anatomy, N° 96.—Plato, and others of the ancients, fix the principle of love in the liver; whence the Latin proverb, *Cogit amare jecur:* and in this ſenſe Horace frequently uſes the word, as when he ſays, *Si torrere jecur quæras Idoneum.* The Greeks, from its concave figure, called it ἧπαρ, "vaulted, ſuſpended;" the Latins call it *jecur*, q. d. *juxta cor*, as being "near the heart." The French call it *foye*, from *foyer*, *focus*, or "fireplace;" agreeable to the doctrine of the ancients, who believed the blood to be boiled and prepared in it.—Eraſiſtratus, at firſt, called it *parenchyma*, i. e. *effuſion*, or *maſs of blood*; and Hippocrates, by way of eminence, frequently calls it the *hypochondrium*.

Liver *of Antimony*. See Chemistry *Index*.

Liver *of Arſenic*, is a combination of white arſenic with potaſh. See Arsenic, Chemistry *Index*.

Liver *of Sulphur*. See *Potash*, *Sulphuret of*, Chemistry *Index*.

Liver-*Wort*. See Marchantia and Lichen, Botany *Index*

Liverpool.

LIVERPOOL, a large, flouriſhing, and populous town of England, in the county of Lancaſter, ſtuated at the influx of the river Merſey into the ſea. This town has ſo much increaſed in trade ſince the commencement of the preſent century, that it is now the greateſt ſea-port in England except London, having exceeded Briſtol conſiderably of late years, which will appear by the following account of the cuſtom-duties, received in the ſeveral ports of London, Liverpool, and Briſtol, in the year 1784, taken from the report of the commiſſioners for inſpecting the ſtate of public accounts.

London,	-	L. 5,187,052	9	5½
Liverpool,	-	640,684	2	2½
Briſtol,	- -	334,909	19	3½
Liverpool exceeded Briſtol,		L.305,774	2	11

The following ſhows how much the trade has increaſed ſince the above period:

Duties received in the port of Liverpool from July 5th 1785, to October 10th 1787, L.298,361 9 10½

The merchants here trade to all parts of the world except Turkey and the Eaſt Indies; but the moſt beneficial trade is to Guinea and the Weſt Indies, by which many of them have acquired very large fortunes.

Liverpool, during the laſt war, carried on more foreign trade than any town in England; and ſuch is the ſtate of it at this time, that there are near three thouſand veſſels cleared from that port in one year to different parts of the world. Here are ſeveral manufactories for China-ware, and pot-houſes which make very fine ware, ſome ſalt-works, glaſs-houſes, and upwards of 50 breweries, from ſome of which large quantities of malt liquor are ſent abroad. Many of the buildings are formed in the moſt elegant manner; but the old ſtreets are narrow; which defect will ſoon be removed, as the corporation have lately obtained an act of parliament for the improvement of the town, which they have already begun to put in force with great ſpirit, having taken down the principal ſtreets in the centre of the town, and rebuilt them in a ſpacious and moſt magnificent manner; ſo that in a few years it will be one of the handſomeſt towns in England. This town contains ſixteen churches, namely, St Peter's, St Nicholas's, St George's, St Thomas's, St Paul's, St Ann's, St John's, Trinity, St James's, St Catharine's, St Mary's, St Stephen's, St Matthew's, St Mark's, Chriſt Church, and All Saints. There are alſo meetings for independents, anabaptiſts, quakers, methodiſts, and preſbyterians. The exchange is a noble ſtructure, built of white ſtone in the form of a ſquare, and round it are piazzas where the merchants aſſemble to tranſact buſineſs. Above it are the mayor's offices, the ſeſſions hall, the council-chamber, and two elegant ball-rooms. The expence of erecting this building amounted to 30,000l. The cuſtom-houſe is ſituated at the head of the old dock, and is a handſome and convenient ſtructure. Here are many charitable foundations, among which is an excellent grammar ſchool well endowed, and many of the youth taught in it have exhibitions in the univerſities. The infirmary is a large edifice of brick and ſtone, ſituated on a hill in a very pleaſant airy ſituation, at one end of the town.

In the town is a charity-ſchool ſupported by voluntary ſubſcriptions and contributions for 50 boys and 12 girls, who are not only clothed and educated, but alſo provided with food and lodging: likewiſe ſeveral alms-houſes for the widows of ſeamen; and an excellent poor-houſe, ſuperior to any in the kingdom, where upwards of 800 men, women, and children, are ſupported, many of whom are employed in ſpinning cotton and wool. There are five large wet docks, three dry docks, and ſeveral graving docks for the repairing of ſhipping; which renders it the moſt commodious ſea-port in the world. The quays which bound theſe docks are covered with warehouſes; which is a convenience that enables the merchant to diſcharge his ſhip at a very ſmall expence. The new priſon lately finiſhed is a noble edifice, being built entirely on the plan of the great and benevolent Mr Howard, for ſolitary confinement; and is perhaps the moſt convenient, airy, magnificent building of the kind of Europe; being upon a very extenſive ſcale.

Liverpool received its charter from King John; but it was a borough by preſcription long before his reign. It is under the government of a recorder, mayor, and an unlimited number of aldermen, two bailiffs, and a common council of forty of the principal inhabitants, with a town-clerk and other proper officers. The town has a weekly market on Saturday, and is diſtant from London 204 miles. The progreſſive riſe of population in Liverpool, may be conceived by peruſing the following table:

Year.	Chriſtened.	Buried.	Married.
1660	3	—	—
1680	106	51	5
1700	132	124	35
1720	410	203	58
1740	485	608	137
1760	986	599	408
1780	1709	1514	606
1787	2267	1773	804

The whole population of Liverpool in the year 1793 was computed to amount to 56,782.

By means of inland navigation, Liverpool has communication with the rivers Dee, Ribble, Ouſe, Trent, Darwent, Severn, Humber, Thames, Avon, &c. which navigation, including its windings, extends above 500 miles, in the counties of Lincoln, Nottingham, York, Weſtmoreland, Cheſter, Stafford, Warwick, Leiceſter, Oxford, Worceſter, &c. The Merſey, upon which the town is ſituated, abounds with ſalmon, cod, flounders, turbot, plaice, and ſmelts; and at full ſea it is above two miles over. In the neighbourhood are frequent horſe-races, on a five-mile courſe, the fineſt for the length in England. The ſoil in and near the town is dry and ſandy, and particularly favourable to the growth of potatoes, on which the farmers often depend more than on wheat or any other grain. Freſh water is brought into the town by pipes, from ſome ſprings four miles off, purſuant to an act of parliament in the reign of Queen Anne. The dock duties of Liverpool in 1760 amounted to 2330l. but in 1805 to 33,364l. an aſtoniſhing proof of the rapid increaſe of its trade. The diſpenſary of this town does honour to human nature, and has been of the moſt ſingular advantage to the afflicted, ſince 172,273 perſons were cured of every diſorder incident to human nature, between the years 1778 and 1794, being on an average about 10,000 perſons every year. The Union News Room was inſtituted on the 1ſt of January 1801; the Lyceum much about the ſame period, the erection of which coſt the ſum of 11,000l. and the Commercial New's Room in 1803. The inſtitution for reſtoring drowned perſons is worthy of notice, as more than 400 people have become objects of it ſince it was founded, and more than one half of that number have been reſtored. The Athenæum, which compriſes a news room and library, was projected in 1798, and finiſhed before the cloſe of the year. There are four weekly papers publiſhed at Liverpool. From 1783 to 1793 incluſive the value of ſlaves imported into the Weſt Indies in Liverpool veſſels, amounted to 15,186,850l. ſterling; and the advantages which it derives from its inland navigation are more than can be properly eſtimated. Liverpool ſends two members to parliament.

LIVERY, in matters of dreſs and equipage, a certain colour and form of dreſs, by which noblemen and gentlemen chooſe to diſtinguiſh their ſervants.

Liveries are uſually taken from fancy, or continued in families by ſucceſſion. The ancient cavaliers, at their tournaments, diſtinguiſhed themſelves by wearing the liveries of their miſtreſſes: thus people of quality make their domeſtics wear their livery.

Father Meneſtrier, in his Treatiſe of Carouſals, has given a very ample account of the mixtures of colours in liveries. Dion tells us, that Oenomaus was the firſt who invented green and blue colours, for the troops which, in the circus, were to repreſent land and ſea fights.

The Romiſh church has alſo her ſeveral colours and liveries; white, for confeſſors and virgins, and in times of rejoicing; black, for the dead; red, for the apoſtles and martyrs; blue or violet, for penitents; and green, in times of hope.

Formerly, great men gave liveries to ſeveral, who were not of their family or ſervants, to engage them in their quarrels for that year; but this was prohibited by the ſtatutes 1 Rich. II. 1 Hen. IV. cap. 27. 2 and 7 Hen. IV. 8 Hen. VI. cap. 4. 8 Ed. IV. cap. 2; and no man, of whatever condition, was allowed to give any livery, but to his domeſtic officers, and counſel learned in the law. However, moſt of the above ſtatutes are repealed by 3 Car. I. cap. 4.

Livery of Seiſin, in *Law*, ſignifies delivering the poſſeſſion of lands, &c. to him who has a right to them.

LIVERYMEN of London, are a number of men choſen from among the freemen of each company. Out of this body the common-council, ſheriff, and other ſuperior officers for the government of the city, are elected; and they alone have the privilege of giving their votes for members of parliament, from which the reſt of the citizens are excluded.

LIVIUS, Titus, the beſt of the Roman hiſtorians, as he is called by Mr Bayle, was born at Patavium, or Padua. Few particulars of his life have been handed

Livius.

handed down to us. Coming to Rome, he acquired the notice and favour of Auguſtus, and there he long reſided. Some have ſuppoſed, (for there is not any proof of it), that he was known to Auguſtus before, by certain Philoſophical Dialogues which he had dedicated to him. Seneca ſays nothing of the dedication: but mentions the dialogues, which he calls hiſtorical and philoſophical; and alſo ſome books, written purpoſely on the ſubject of philoſophy. Be this as it will, it is probable that he began his hiſtory as ſoon as he was ſettled at Rome; and he ſeems to have devoted himſelf ſo entirely to the great work he had undertaken, as to be perfectly regardleſs of his own advancement. The tumults and diſtractions of Rome frequently obliged him to retire to Naples; not only that he might be leſs interrupted in the purſuit of his deſtined taſk, but alſo enjoy that retirement and tranquillity which he could not have at Rome, and which yet he ſeems to have much ſought after: for he was greatly diſſatisfied with the manners of his age, and tells us, that "he ſhould reap this reward of his labour, in compoſing the Roman hiſtory, that it would take his attention from the preſent numerous evils, at leaſt while he was employed upon the firſt and earlieſt ages." He uſed to read parts of this hiſtory, while he was compoſing it, to Mecænas and Auguſtus; and the latter conceived ſo high an opinion of him, that he pitched upon him to ſuperintend the education of his grandſon Claudius, who was afterwards emperor. After the death of Auguſtus, Livy returned to the place of his birth, where he was received with all imaginable honour and reſpect: and there he died, in the fourth year of the reign of Tiberius, aged above ſeventy. Some ſay, he died on the ſame day with Ovid: it is certain that he died the ſame year.

Scarce any man was ever more honoured, alive as well as dead, than this hiſtorian. Pliny the younger relates, that a native gentleman travelled from Gades, in the extremeſt parts of Spain, to ſee Livy: and, though Rome abounded with more ſtupendous and curious ſpectacles than any city in the world, yet he immediately returned; as if, after having ſeen Livy, nothing farther could be worthy of his notice. A monument was erected to this hiſtorian in the temple of Juno, where was afterwards founded the monaſtery of St Juſtina. There, in 1413, was diſcovered the following epitaph upon Livy: *Oſſa Titi Livii Patavini, omnium mortalium judicio digni, cujus prope invicto calamo invicti populi Romani res geſtæ conſcriberentur*; that is, "The bones of Titus Livius of Patavium, a man worthy to be approved by all mankind, by whoſe almoſt invincible pen the acts and exploits of the invincible Romans were written." Theſe bones are ſaid to be preſerved with high reverence to this day, and are ſhown by the Paduans as the moſt precious remains. In 1451, Alphonſus, king of Arragon, ſent his ambaſſador, Anthony Panormita, to deſire of the citizens of Padua the bone of that arm with which this their famous countryman had written his hiſtory; and, obtaining it, cauſed it to be conveyed to Naples with the greateſt ceremony as a moſt invaluable relic. He is ſaid to have recovered from an ill ſtate of health by the pleaſure he found in reading this hiſtory: and therefore, out of gratitude, put upon doing extraordinary honours to the memory of the writer. Panormita alſo, who was a native of Palermo in Sicily, and one of the ableſt men of the 15th century, ſold an eſtate to purchaſe this hiſtorian.

Livius.

The hiſtory of Livy, like other great works of antiquity, is tranſmitted down to us exceedingly mutilated and imperfect. Its books were originally a hundred and forty-two, of which are extant only thirty-five. The epitomes of it, from which we learn their number, all remain, except thoſe of the 136th and 137th books. Livy's books have been divided into decades, which ſome will have to have been done by Livy himſelf, becauſe there is a preface to every decade; while others ſuppoſe it to be a modern contrivance, ſince nothing about it can be gathered from the ancients. The firſt decade, beginning with the foundation of Rome, is extant, and treats of the affairs of 460 years. The ſecond decade is loſt; the years of which are ſeventy-five. The third decade is extant, and contains the ſecond Punic war, including eighteen years. It is reckoned the moſt excellent part of the hiſtory, as giving an account of a very long and ſharp war, in which the Romans gained ſo many advantages, that no arms could afterwards withſtand them. The fourth decade contains the Macedonian war againſt Philip, and the Aſiatic war againſt Antiochus, which take up the ſpace of about 23 years. The five firſt books of the fifth decade were found at Worms, by Simon Grynæus, in 1431, but are very defective; and the remainder of Livy's hiſtory, which reaches to the death of Druſus in Germany in 746, together with the ſecond decade, are ſupplied by Freinſhemius.

Never man perhaps was furniſhed with greater advantages for writing a hiſtory than Livy. Beſides his own great genius, which was in every reſpect admirably formed for the purpoſe, he was trained as it were in a city, at that time the empreſs of the world, and in the politeſt reign that ever was; having ſcarcely had any other ſchool than the court of Auguſtus. He had acceſs to the very beſt materials, ſuch as the Memoirs of Sylla, Cæſar, Labienus, Pollio, Auguſtus, and others, written by themſelves. "What writers of memorials (ſays Lord Bolinbroke), what compilers of the Materia Hiſtorica, were theſe! What genius was neceſſary to finiſh up the pictures that ſuch maſters had ſketched! Rome afforded men that were equal to the taſk. Let the remains, the precious remains, of Salluſt, of Livy, and of Tacitus, witneſs this truth.—What a ſchool of public and private virtue had been opened to us at the reſurrection of learning, if the latter hiſtorians of the Roman commonwealth, and the firſt of the ſucceeding monarchy, had come down to us entire! The few that are come down, though broken and imperfect, compoſe the beſt body of hiſtory that we have; nay, the only body of ancient hiſtory that deſerves to be an object of ſtudy. It fails us indeed moſt at that remarkable and fatal period, where our reaſonable curioſity is raiſed the higheſt. Livy employed forty-five books to bring his hiſtory down to the end of the ſixth century, and the breaking out of the third Punic war: but he employed ninety-five to bring it down from thence to the death of Druſus; that is, through the courſe of 120 or 130 years. Appian, Dion Caſſius, and others, nay, even Plutarch included, make us but poor amends for what is loſt of Livy." Speaking then of Tully's orations and [illegible] beſt adventitious helps to ſupply this loſs, he ſays, that "the age in which Livy flouriſhed, abounded with ſuch materials as theſe: they were freſh, they were authentic: it was eaſy to procure them; it was ſafe to employ them. How he did employ them in executing the ſecond part of his deſign, we may judge from his execution of the firſt: and, I own, I ſhould be glad to exchange, if it were poſſible, what we have of this hiſtory for what we have not. Would you not be glad, my Lord, to ſee, in one ſtupendous draught, the whole progreſs of that government from liberty to ſervitude; the whole ſeries of cauſes and effects, apparent and real, public and private ?" &c.

The encomiums beſtowed upon Livy, by both ancients and moderns, are great and numerous. He not only entertains like Herodotus; he alſo inſtructs and intereſts in the deepeſt manner. But his great probity, candour, and impartiality, are what have diſtinguiſhed Livy above all hiſtorians; for neither complaiſance to the times, nor his particular connexions with the emperor, could reſtrain him from ſpeaking well of Pompey; ſo well, as to make Auguſtus call him a *Pompeian*. This we learn from Cremutius Cordus, in Tacitus; who relates alſo, much to the emperor's honour, that this gave no interruption to their friendſhip. But whatever elogies Livy may have received as an hiſtorian, he has not eſcaped cenſure as a writer. In the age wherein he lived, Aſinius Pollio charged him with Patavinity; which Patavinity has been variouſly explained by various writers, but is generally ſuppoſed to relate to his ſtyle. The moſt common is, that this noble Roman, accuſtomed to the delicacy of the language ſpoken in the court of Auguſtus, could not bear with certain provincial idioms, which Livy, as a Paduan, uſed in divers places of his hiſtory. Pignorius is of another opinion, and believes that this Patavinity regarded the orthography of certain words, wherein Livy uſed one letter for another, according to the cuſtom of his country, writing *ſibe* and *quaſe* for *ſibi* and *quaſi*; which he attempts to prove by ſeveral ancient inſcriptions. The expreſſions, however, or the orthography of words, are not loaded with obſcurity, and the perfect claſſic is as familiarly acquainted with thoſe ſuppoſed provincialiſms as with the pureſt Latinity.—Livy has been cenſured too, and perhaps with juſtice, for being too credulous, and burdening his hiſtory with vulgar notions and ſuperſtitious tales. He may diſguſt when he mentions that milk and blood were rained from heaven, or that an ox ſpoke or a woman changed her ſex; yet he candidly confeſſes that he recorded only what made an indelible impreſſion upon the minds of a credulous age.

Is it worth while to mention here the capricious and tyrannic humour of the emperor Caligula, who accuſed Livy of being a negligent and wordy writer, and reſolved therefore to remove his works and ſtatues out of all libraries, where he knew they were curiouſly preſerved? Or the ſame humour in Domitian, another prodigy of nature, who put to death Metius Pompoſianus, becauſe he made a collection of ſome orations of kings and generals out of Livy's hiſtory? Pope Gregory the Great, alſo, would not ſuffer Livy in any Chriſtian library, becauſe of the Pagan ſuperſtition wherewith he abounded: but the ſame reaſon held good againſt all ancient authors; and indeed Gregory's zeal was far from being levelled at Livy in particular, the pontiff having declared war againſt all human learning.

Though we know nothing of Livy's family, yet we learn from Quintilian, that he had a ſon, to whom he addreſſed ſome excellent precepts in rhetoric. An ancient inſcription ſpeaks alſo of one of his daughters, named *Livia Quarta*: the ſame, perhaps, that eſpouſed the orator Lucius Magius, whom Seneca mentions; and obſerves, that the applauſes he uſually received from the public in his harangues, were not ſo much on his own account, as for the ſake of his father-in-law.

Our author's hiſtory has been often publiſhed with and without the ſupplement of Freinſhemius. The beſt editions are, that of Gronovius, *cum notis variorum et ſuis*, Lugd. Bat. 1679, 3 vols 8vo; that of Le Clerc at Amſterdam, 1709, 10 vols 12mo; and that of Crevier, at Paris, 1735, 6 vols 4to. Theſe have the ſupplements.—Learning perhaps never ſuſtained a greater loſs, in any ſingle author, than by the deſtruction of the latter and more intereſting part of Livy. Several eminent moderns have indulged the pleaſing expectation that the entire work of this noble hiſtorian might yet be recovered. It has been ſaid to exiſt in an Arabic verſion: and even a complete copy of the original is ſuppoſed to have been extant as late as the year 1631, and to have periſhed at that time in the plunder of Magdeburg. The munificent patron of learning, Leo X. exerted the moſt generous zeal to reſcue from oblivion the valuable treaſure, which one of his moſt bigotted predeceſſors, above mentioned, had expelled from every Chriſtian library. Bayle has preſerved, under the article Leo, two curious original letters of that pontiff, concerning his hopes of recovering Livy; which afford moſt honourable proofs of his liberality in the cauſe of letters.—A lately diſcovered fragment of Livy's hiſtory was publiſhed in 1773 by Dr Bruns.

LIVIUS *Andronicus*, a comic poet who flouriſhed at Rome about 240 years before the Chriſtian era. He was the firſt who turned the perſonal ſatires and feſcennine verſes, ſo long the admiration of the Romans, into the form of a proper dialogue and regular play. Though the character of a player, ſo valued and applauded in Greece, was reckoned vile and deſpicable among the Romans, Andronicus acted a part in his dramatical compoſitions, and engaged the attention of his audience, by repeating what he had laboured after the manner of the Greeks. Andronicus was the freedman of M. Livius Salinator, whoſe children he educated. His poetry was grown obſolete in the age of Cicero, whoſe nicety and judgement would not even recommend the reading of it.

LIVONIA, a large province of the Ruſſian empire, with the title of a duchy. It is bounded on the north by the gulf of Finland, on the weſt by that of Riga, on the ſouth by Courland, and on the eaſt, partly by Pleſcow, and partly by Novogorod. It is about 250 miles from north to ſouth, and 150 from eaſt to weſt. The land is ſo fertile in corn, that it is called the *granary of the north*: and would produce a great deal more, if it was not ſo full of lakes. The fiſh that abound here are ſalmons, carps, pikes, flat fiſh, and many others. In the foreſts there are wolves, bears, elks, rein-deer, ſtags, and hares. The domeſtic animals are very numerous; but the ſheep bear very bad wool. Here are a great number of foreſts, which conſiſt of birch trees, pines, and oaks; and all the houſes of the inhabitants are built with wood. The merchandiſes which they ſend abroad are flax, hemp, honey, wax, leather ſkins, and potaſhes. The Swedes were formerly poſſeſſed of this province, but were obliged to abandon it to the Ruſſians after the battle of Pultowa; and it was ceded to them by the peace of the north, concluded in 1722, which was confirmed by another treaty in 1742. It is divided into two provinces, viz. Letonia and Eſtonia; and two iſlands called *Oeſel* and *Dagho*, which are again ſubdivided into ſeveral diſtricts.

LIVONICA-TERRA, a kind of fine bole uſed in the ſhops of Germany and Italy. It is found in Livonia, from whence it takes its name. It is in the form of little cakes.

LIVRE, a French money of account, containing 20 ſols. See *Money-Table*.

LIXA, or **Lixus**, in *Ancient Geography*, a town on the Atlantic near the river Lixus; made a Roman colony by Claudius Cæſar; famous in mythology for the palace of Antæus and his encounter with Hercules, (Pliny). Now *Larache*, 65 leagues to the ſouth of the ſtraits of Gibraltar.

LIXIVIOUS, an appellation given to ſalts obtained from burnt vegetables by pouring water on their aſhes.

LIXIVIUM, in *Pharmacy*, &c. a ley obtained by pouring ſome liquor upon the aſhes of plants; which is more or leſs powerful, as it has imbibed the fixed ſalts contained in the aſhes.

LIXNAW, a barony in the county of Kerry and province of Munſter in Ireland, which gives title of baron to the earls of Kerry; the village here of this name being their ancient ſeat, where the caſtle was erected. This ſeat ſtands agreeably on the river Brick, which is here cut into ſeveral pleaſant navigable canals, that adorn its plantations and gardens. W. Long. 9. 15. N. Lat. 52. 15.

LIZARD. See Lacerta, Erpetology *Index*.

Lizard, in *Geography*, a cape or promontory of Cornwall, ſituated, according to the moſt common computation, in W. Long. 5. 47. N. Lat. 49. 50.

LLANDAFF. See Landaff.

LLOYD, William, a moſt learned Engliſh writer and biſhop, was born in Berkſhire in England in 1627. He was educated under his father, rector of Sonning, and vicar of Tyle-hurſt in Berkſhire; then went to Oxford, and took orders. In 1660 he was made prebendary of Rippon; and in 1666 chaplain to the king. In 1667 he took the degree of doctor of divinity, in 1672 he was inſtalled dean of Bangor; and in 1680 was conſecrated biſhop of St Aſaph. He was one of the ſix biſhops who, with Archbiſhop Sancroft, were committed priſoners to the Tower of London, for ſubſcribing a petition to the king againſt diſtributing and publiſhing his declaration for liberty of conſcience. Soon after the revolution he was made almoner to King William and Queen Mary: in 1692 he was tranſlated to the biſhopric of Litchfield and Coventry; and in 1699, to the ſee of Worceſter, where he ſat till his death, which happened in 1717, the 91ſt year of his age. Dr Burnet gives him an exalted character, and his works are highly eſteemed.

LOACH. See Cobitis, Ichthyology *Index*.

LOAD, or **Lode**, in mining, a word uſed eſpecially in the tin-mines, for any regular vein or courſe, whether metallic or not; but moſt commonly load means a metallic vein. When the ſubſtances forming theſe loads are reducible to metal, the loads are by the Engliſh miners ſaid to be alive; otherwiſe they are termed dead loads.

In Cornwall and Devonſhire the loads chiefly hold their courſe from eaſtward to weſtward, though in other parts of England they frequently run from north to ſouth. See Veins, Geology *Index*.

Load is alſo uſed for nine diſhes of ore, each diſh being about half a hundred weight.

LOADSTONE. See Magnet.

LOAMS, in *Natural Hiſtory*, are defined to be earths compoſed of diſſimilar particles, ſtiff, denſe, hard, and rough to the touch; not eaſily broke while moiſt, readily diffuſible in water, and compoſed of ſand and a tough viſcid clay. Of theſe loams ſome are whitiſh, and others brown and yellow.

LOAN, any thing given to another, on condition of return or payment.

Public Loans. See Funds and *National Debt*.

LOANDA, a province of the kingdom of Angola in Africa. It is an iſland about 15 miles in length, and three in breadth; remarkable chiefly for the capital of Angola ſituated upon it, in E. Long. 12. 25. S. Lat. 8. 45. This town was built by the Portugueſe in 1578, under the direction of the firſt Portugueſe governor in theſe parts. It is large, populous, and pleaſantly ſeated on the declivity of a hill near the ſea-coaſt, and facing the ſouth-weſt. The iſland is ſupplied with freſh water from wells dug in it; and which are not ſunk below the depth of three feet when they are filled with excellent water. It is remarkable, however, that the water of theſe wells continues good only during the time of high tide; for, as that ſinks, the water becomes more and more brackiſh, till at laſt it is quite ſalt, almoſt as much as the ſea itſelf. On the coaſt of this iſland are fiſhed the zimbis, or ſhells uſed in ſeveral parts of Africa inſtead of money; and with theſe ſhells, inſtead of coin, is carried on a great part of the traffic of this country.

LOANGO, a kingdom of Africa, extending itſelf about 180 geographical miles in length from ſouth to north; that is, from Cape St Catherine under the ſecond degree of ſouth latitude, to a ſmall river called *Lovanda Louiſia*, on the 5th degree of the ſame. From weſt to eaſt it extends from Cape Negro on the coaſt of Ethiopia towards the *Buchumalean* mountains, ſo called on account of their vaſt quantity of ivory and great droves of elephants, about 300 miles. It is divided into four principal provinces, viz. thoſe of Lovangiri, Loango-mongo, Chilongo, and Piri.

The inhabitants are very black, well ſhaped, and of a mild temper. The men wear long petticoats, from the waiſt downwards, and have a piece of cloth round their waiſt. The women's petticoats are made of ſtraw.

This country abounds with poultry, oxen, cows, ſheep, goats, elephants, tigers, leopards, civet-cats, and other animals; ſo that here are great quantities of elephants teeth, and fine furs, to be traded for.

The capital city, where the king reſides, called *Loango*, and, in the language of the negroes, *Boarie*, is ſituated in South Lat. 4½ degrees, a league and a half from the ſea coaſt, and is ſhaded and adorned with bananas, and other trees. The king, who reſides in a large palace in the middle of it, has about 1500 concubines. If any of them is ſurpriſed in adultery, ſhe and her paramour are inſtantly conveyed to the top of a very high hill, whence they are hurled down headlong from the ſteepeſt place.

Every man marries as many wives here as he pleaſes, who are obliged to get their huſbands a livelihood, as is the practice all along the African coaſt inhabited by blacks. The women, therefore, cultivate the land, ſow and reap, while the lazy huſbands loiter away their time in idleneſs.

The king's revenue conſiſts in elephants teeth, copper, and a kind of petticoats made of palm-tree leaves, and called *lavogus:* he has whole ſtore-houſes full of these lavogus; but his greateſt riches conſiſt in ſlaves of both ſexes.

LOBBY, in *Architecture*, is a ſmall hall or waiting-room: it is alſo an entrance into a principal apartment, where there is a conſiderable ſpace between that and a portico or veſtibule, and the length or dimenſions will not allow it to be conſidered as a veſtibule or an anti-room. See ANTICHAMBER.

LOBE, in *Anatomy*, any fleſhy protuberant part, as the lobes of the lungs, the lobes of the ears, &c.

LOBELIA, CARDINAL-FLOWER; a genus of plants belonging to the ſyngeneſia claſs; and in the natural method ranking under the 29th order, *Campanaceæ*. See BOTANY *Index*.

LOBETUM, anciently a town of the Hither Spain: ſaid to have been built by the Libyan Hercules, (Pliny). Now *Albarazin*, a town of Arragon on the confines of New Caſtile, on the river Guadalavir. E. Long. 2. N. Lat. 40. 40.

LOBO, JEROME, a Jeſuit miſſionary, was born at Liſbon in the year 1593. He became a member of the Jeſuit ſociety at 16 years of age, and in 1622 went out as a miſſionary to the Eaſt Indies. He ſailed to the coaſt of Mozambique, after making ſome ſtay at Goa; and afterwards penetrated into Abyſſinia, where his zeal and reſolution brought on him the hatred of the monks, from which he incurred much danger and ſuffering. As he returned to Portugal he was ſhipwrecked on the coaſt of Natal, where ſeven months were ſpent in conſtructing ſhallops to bring them away. One of them foundered, but that in which Father Lobo ſailed arrived ſafe at Angola. After a variety of adventures he arrived at Liſbon; and he employed himſelf in the cauſe of the Ethiopian miſſion both at Madrid and Rome. He took a ſecond voyage to the Indies, where he was made rector of the houſe at Goa. He returned to Liſbon in 1658, and was choſen rector of the college of Coimbra, where he died in 1678, at the age of 84.

Lobo wrote an hiſtorical account of Abyſſinia in the Portugueſe language, which contains information both curious and valuable. It was tranſlated into French by the abbé le Grand in 4to, in 1728; and the earlieſt production of Dr Samuel Johnſon was an abridged verſion of this work.

LOBSTER, a ſpecies of cancer. See CANCER, ENTOMOLOGY *Index*.

LOCAL, in *Law*, ſomething fixed to the freehold, or tied to a certain place; thus, real actions are local, ſince they muſt be brought in the country where they lie; and local cuſtoms are thoſe peculiar to certain countries and places.

Local Medicines, thoſe deſtined to act upon particular parts; as fomentations, epithems, veſicatories, &c.

LOCARNO, a town of Swiſſerland, capital of a bailiwick of the ſame name, ſeated at the north end of the lake Maggiore, near the river Magie. It carries on a great trade; and the country abounds in paſtures, wine, and fruits. E. Long. 8. 41. N. Lat. 46. 6.

LOCHABER, a diſtrict of the ſhire of Inverneſs in Scotland. It is bounded by Moydart on the weſt, Glengary on the north, Badenoch on the eaſt, and Lorn on the ſouth. It derives its name from the lake or loch Aber; and extends about [illegible] miles from eaſt to weſt, and 30 from north to ſouth. The country is barren, bleak, mountainous, and rugged. Near the mouth of the river Aber, in the centre between the Weſt and North Highlands, ſtands Fort William, with the town of Maryburgh, built upon a navigable arm of the ſea, not far from the foot of *Benevis*. The town, deſigned as a ſuttlery for the garriſon, was erected into a borough: and the fort itſelf was deſigned as a check upon ſome of the clans, who had been guilty of depredations and other irregularities. Lochaber is inhabited moſtly by the Macdonalds, Camerons, and Mackintoſhes. The caſtle of Macdonald of Glengary, in this diſtrict, was burnt to the ground in the year 1715, in conſequence of his declaring for the Pretender. The elegant houſe and gardens belonging to Cameron of Lochiel underwent the ſame fate, for the ſame reaſon, in the year 1746.

LOCHIA, in *Midwifery*, a flux from the uterus conſequent to delivery. See MIDWIFERY.

LOCK, a well-known inſtrument uſed for faſtening doors, cheſts, &c. generally opened by a key.

The lock is reckoned the maſterpiece in ſmithery; a great deal of art and delicacy being required in contriving and varying the wards, ſprings, bolts, &c. and adjuſting them to the places where they are to be uſed, and to the various occaſions of uſing them.

From the various ſtructure of locks, accommodated to their different intentions, they acquire various names. Thoſe placed on outer doors are called *ſtock-locks;* thoſe on chamber doors, *ſpring-locks;* thoſe on trunks, *trunk-locks*, *pad-locks*, &c.

Of theſe the ſpring-lock is the moſt conſiderable, both for its frequency and the curioſity of its ſtructure. Its principal parts are, the main-plate, the cover-plate, and the pin-hole: to the main-plate belong the key-hole, top-hook, croſs-wards, bolt-toe or bolt-knab, drawback-ſpring tumbler, pin of the tumbler, and the ſtaples; to the cover-plate belong the pin, main-ward, croſs-ward, ſtep-ward or dap-ward; to the pin-hole belong the hook-ward, main croſs-ward, ſhank, the pot or bread, bow-ward, and bit.

As on the proper conſtruction of locks the ſecurity of the moſt valuable kinds of property almoſt entirely depends, and as numberleſs devices are continually fallen upon to elude the utmoſt efforts of mechanical invention in this reſpect, it thence becomes an object of no ſmall importance to invent a lock which it ſhould be *impoſſible* to open except by its proper key. A treatiſe upon this ſubject has been publiſhed by Mr Joſeph

Lock.

ſeph Bramah; who is confident that he has brought the matter to the requiſite perfection, and that every one may reſt aſſured of the ſecurity of his property when under the protection of a lock of his invention. He begins with obſerving, that the principle on which all locks depend, is the application of a lever to an interior bolt, by means of a communication from without; ſo that, by means of the latter, the lever acts upon the bolt, and moves it in ſuch a manner as to ſecure the lid or door from being opened by any pull or puſh from without. The ſecurity of locks in general therefore depends on the number of impediments we can interpoſe betwixt the lever (the key) and the bolt which ſecures the door; and theſe impediments are well known by the name of *wards*, the number and intricacy of which alone are ſuppoſed to diſtinguiſh a good lock from a bad one. If theſe wards, however, do not in an effectual manner preclude the acceſs of *all* other inſtruments beſides the proper key, it is ſtill poſſible for a mechanic of equal ſkill with the lock-maker to open it without the key, and thus to elude the labour of the other.

"Locks (ſays our author) have been conſtructed, and are at preſent much uſed and held in great eſteem, from which the picklock is excluded: but the admiſſion of falſe keys is an imperfection for which no lock-ſmith has ever found a corrective; nor can this imperfection be remedied whilſt the protection of the bolt is wholly confided to *fixed wards*." This poſition is proved by a remark, that the wards, let them be as intricate as we pleaſe, muſt all be expreſſed on what is called the *bit* or *web* of the key: and therefore, when all the varieties that can be expreſſed on this bit or web have been run through, every ſucceeding lock muſt be the counterpart of ſome other; and conſequently the ſame key which opens one will open the other alſo. This is evident from the locks uſually put upon drawers; and which, though they ſhould be made to reſiſt the picklock, are ſtill liable to be opened by ten thouſand other keys beſides that appropriated to each of them. But though the variety of wards could be augmented even to infinity, ſtill there could be no ſecurity againſt falſe keys; for as every one of the wards muſt be expreſſed on the web of the key, if another key with a web quite plain be made to fit the key-hole exactly, we have only to cover it over with ſome colouring ſubſtance upon which the wards may make an impreſſion; after which, it is eaſy to cut out the web in a proper manner for admitting them, when the lock will be as eaſily opened by the falſe as by the true key.

The firſt perſon, according to our author, who had any claim to merit in the branch of lock-making, is Mr Baron; whoſe lock he acknowledges to be by far more perfect and ſecure than any that ever appeared before; though he ſtill conſiders it as unfit for giving that abſolute ſecurity which is to be wiſhed for. His improvement conſiſted in the proper application of what are called *tumblers*. "Theſe (ſays Mr Bramah) are a kind of grapples by which the bolt is confined, as well in its active as in its paſſive ſtation, and rendered immoveable till ſet at liberty by the key. One of theſe inſtruments is commonly introduced into all locks that are of any uſe or value: it is lodged behind the bolt, and is governed by a ſpring which acts upon the tumbler as the tumbler acts upon the bolt: The application therefore of any force to the tumbler, which is ſuperior to the force of the ſpring, will cauſe it to quit its hold, and ſet the bolt at liberty." In the common method of applying theſe machines, however, it matters nothing how far the tumbler is lifted above the point at which it ceaſes to controul the bolt; but it is otherwiſe in thoſe of Mr Baron's conſtruction. The action of his tumblers is circumſcribed by a certain ſpace cut in the centre of the bolt, of dimenſions ſufficient only to anſwer the purpoſe intended. The ſpace in which the tumbler moves is an oblong ſquare; and is not only furniſhed with niches on the under ſide, into which the hooks of the tumblers are forced by the ſpring as in other locks, but is provided with correſpondent niches on the other ſide, into which the hooks are driven, if any greater force be applied to the tumblers than what is juſt ſufficient to diſengage them from the bolt. Hence it becomes abſolutely neceſſary, in the making of a falſe key, to conſtruct it in ſuch a manner, that it may with the greateſt exactneſs give the requiſite degree of preſſure, and no more.

Mr Bramah allows that this is a very great improvement, but objects that it is ſtill poſſible to frame a key which will open it as well as its own; nor will the addition of any number of tumblers preclude the poſſibility of opening it. "By giving (ſays he) an uniform motion to the tumblers, and preſenting them with a face which exactly tallies with the key, they ſtill partake, in a very great degree, of the nature of *fixed wards*; and the ſecurity of this lock is thereby rendered in a proportionable degree defective. Thus, ſuppoſe the falſe key to have paſſed the wards, and to be in contact with the moſt prominent of the tumblers, the impreſſion, which the ſlighteſt touch will leave on the key, will direct the application of the file till ſufficient ſpace is prepared to give it a free paſſage. The key will then bear upon a more remote tumbler; which difficulty being in like manner got over, the lock will be as eaſily opened by the falſe as by the true key."

This ſeemingly inſuperable objection to the perfection of lock-making, however, our author removes with the greateſt eaſe imaginable, by cauſing the tumblers which project unequally to preſent a *plane* [illegible] whence they would require a ſeparate and unequal motion to diſengage them; of conſequence no diſtinct impreſſion could be made by them upon the plane ſurface of the web that would give any idea of their poſitions with regard to one another, and the conſtruction of a falſe key would be altogether impoſſible.

But though the principal difficulty with regard to Mr Baron's lock be now overcome, others ſtill occur, viz. the difficulty of making locks which are conſtructed with tumblers ſufficiently durable. The tumblers themſelves, he obſerves, muſt be but ſlightly made; and being expoſed to perpetual friction by the key and their own proper motion, they muſt ſoon decay; and the keys of Mr Baron's locks, he alſo obſerves, are much leſs durable than thoſe of any other locks he ever ſaw.

With regard to the lock which Mr Bramah preſents to the public as abſolutely perfect, he informs us, that the idea of conſtructing it was firſt ſuggeſted by the alarming increaſe of houſe-robberies, which may [illegible] ſuppoſed to be perpetrated in a great meaſure by perfidious ſervants, or accompliſhed by their connivance. Thus it is evident, that the locks which might exclude ordinary houſebreakers could be no ſecurity againſt faithleſs ſervants, who having conſtant acceſs to the locks, might eaſily get falſe keys fabricated at their leiſure. In conſidering the ſubject, our author was convinced, that his hope of ſucceſs depended entirely upon his uſing means as diſſimilar as poſſible to thoſe by which the old locks were conſtructed; as theſe, however varied, had been found inſufficient for the purpoſe. "As nothing (ſays he) can be more oppoſite in principle to *fixed wards* than a lock which derives its properties from the *motion* of all its parts, I determined that the conſtruction of ſuch a lock ſhould be the ſubject of my experiment." In the proſecution of this experiment he had the ſatisfaction to find, that the leaſt perfect of all his models fully aſcertained the truth and certainty of his principle. The excluſion of wards made it neceſſary to cut off all communication between the key and the bolt; as the ſame paſſage, which (in a lock *ſimply* conſtructed) would admit the key, might give admiſſion likewiſe to other inſtruments. The office, therefore, which in other locks is performed by the extreme point of the key, is here aſſigned to a lever, which cannot approach the bolt till every part of the lock has undergone a change of poſition. The neceſſity of this change to the purpoſes of the lock, and the abſolute impoſſibility of effecting it otherwiſe than with the proper key, are the points to be aſcertained; and this our author does in the following manner.

Plate CCXCVI.

Fig. 1. Shows Mr Bramah's firſt attempt to conſtruct a lock upon this principle: which, to his ſurpriſe, turned out complete and perfect. A repreſents a common axis on which the ſix levers, croſſing the face of the lock, are united as on a joint. Each of theſe reſts upon a ſeparate ſpring ſufficiently ſtrong to bear its weight; or, if depreſſed by a ſuperior force, to reſtore it to its proper poſition when that force is removed. B repreſents a frame through which the levers paſs by ſeparate grooves, exactly fitted to their width, but of ſufficient depth to allow them a free motion in a perpendicular direction. The part which projects from the oppoſite ſide of the joint A, and is inſerted in the bolt C, is a lever to which two offices are aſſigned; one to keep the bolt in a fixed poſition, in the abſence of the key; the other, to give it its proper motion upon the application of the key. D is a circular platform turning upon a centre. On this the joint or carriage of the levers, and the ſprings on which they reſt, are fixed; and the motion of this platform impels the bolt, in either direction, by means of the lever which is projected from the joint A. The inviolable reſtraint upon this lock, by which means it is ſubjected only to the action of the key, is lodged in the part E, which is a thin plate, bearing at each extremity on a block, and having of courſe a vacant ſpace beneath, equal in height to the thickneſs of the blocks on which it reſts. By this plate the motion of the machine is checked or guided in the following manner: On the edge of the plate which faces the movement there are ſix notches which receive the ends of the levers projecting beyond the frame B; and while they are confined in this manner the motion of the machine is ſo totally ſuſpended as to defy every power of art to overcome.

To underſtand in what manner the proper key of this lock overcomes theſe obſtacles, it muſt be obſerved, that each lever has a notch on its extremity, and that thoſe notches are diſpoſed as irregularly as poſſible. To give the machine a capacity of motion, theſe notches muſt be brought parallel to each other, and by a diſtinct but unequal preſſure upon the levers, be formed into a groove in a direct line with the edge of the plate E, which the notches are exactly fitted to receive. The leaſt motion of the machine, while the levers are in this poſition, will introduce the edge of the plate into the groove; which, controuling the power of the ſprings, will give liberty to the levers to move in a horizontal direction as far as the ſpace between the blocks which ſupport the plate E will admit, and which is ſufficient to give the machine a power of acting on the bolt. The impoſſibility of thus bringing the notches on the points of the levers into a direct line, ſo as to tally with the edge of the plate E by any other means than the motion and impulſe of the key, is that which conſtitutes the principal excellency of this lock.

The key (fig. 2.) exhibits ſix different ſurfaces, againſt which the levers are progreſſively admitted in the operation of opening the lock: the irregularity of theſe ſurfaces ſhows the unequal and diſtinct degree of preſſure which each lever requires to bring them to their proper bearings, in order to put the machine in motion. Hence it appears, that unleſs the various heights of the ſurfaces expreſſed on the bit of the key are exactly proportioned to the ſeveral diſtances neceſſary to bring the notches into a ſtraight line with each other, they muſt remain immoveable; "and (ſays our author) as one ſtroke of a file is ſufficient to cauſe ſuch a diſproportion as will prove an inſurmountable impediment to their motion, I may ſafely aſſert, that it is not in art to produce a key or other inſtrument, by which a lock, conſtructed upon this principle, can be opened."

On this principle it would even be a matter of great difficulty for any workman, however ſkilful, to conſtruct a key for the lock when open to his inſpection: "for the levers being raiſed, by the ſubjacent ſprings, to an equal height in the frame B, preſent a *plane* ſurface; and conſequently convey no direction that can be of any uſe in forming a tally to the *irregular* ſurface which they preſent when acting in ſubjection to the key. Unleſs therefore we can contrive a method to bring the notches on the points of the levers in a direct line with each other, and to retain them in that poſition till an exact impreſſion of the irregular ſurface, which the levers will then exhibit, can be taken; the workman will be unable to fit a key to the lock, or to move the bolt. This proceſs muſt be rendered extremely troubleſome by means of the ſprings; and if ſuch difficulties occur, even when the lock is open to the inſpection of a ſkilful workman, much more muſt we ſuppoſe it out of the power of one who has not acceſs to the internal parts to make a falſe key to a lock of this kind.

Theſe difficulties render it neceſſary in making locks of this kind not to fit the key to the lock, as is uſual in other locks, but to fit the lock to the key. In this kind of lock, therefore, the key must be made firſt; and the inequalities upon the ſurface of the bit worked as chance or fancy may direct, without any reference to the lock. The key being thus completed, and applied to the ſurface of the levers, will, by a gentle preſſure, force them to unequal diſtances from their common ſtation in the frame B, and ſink their points to unequal depths into the ſpace beneath the plate E. While the levers are in this poſition, the edge of the plate E will mark the preciſe point at which the notch on each lever muſt be expreſſed. The notches being cut by this direction, the irregularity which appears when the levers reſume their ſtation in the frame B, and the inequality of the receſſes on the bit of the key, will appear as a ſeal and its correſponding impreſſion.

The following is a lock contrived upon the ſame principle, but more curious; and, in our author's opinion, more extenſively uſeful. Fig. 3. repreſents a circular block of metal divided from the centre into eight compartments, each containing a cell which forms a paſſage through the block, as is repreſented by the ſmall circles deſcribed on the flat ſurface A. In each of theſe cells two grooves are cut at oppoſite points, which open a communication with the centre at one point, and with the ſpherical ſurface of the block or barrel at the other. The ſmall circle, which marks the centre of the flat ſurface A, is the key-hole, which likewiſe forms a paſſage through the barrel in a parallel line with the cells which ſurround it. This figure repreſents the frame in which the active parts of the lock are depoſited.

Fig. 4. ſhows a ſpiral ſpring lodged in the bottom of each cell, and occupying one half of the ſpace, the other being filled with a ſlider reſting upon the ſpring, and repreſented by fig. 5. the office of theſe ſliders exactly correſponding with that of the levers in the lock already deſcribed. Thus, when lodged in their reſpective cells, they are ſuſtained, like the levers, by the elaſticity of the ſprings upon which they reſt, till a ſuperior power be applied; and they are again reſtored to their ſtations by the reaction of the ſprings when the weight is removed. The ſide B of each ſlider is projected beyond the circular ſurface, as repreſented fig. 6. in a manner ſimilar to the projection of the levers in the former lock beyond the curved frame in which they move. The point C is projected through the interior groove into the ſpace which forms the centre or key-hole, expreſſed on the flat ſurface A.

Fig. 7. repreſents the key. When this is applied, it muſt of courſe encounter theſe interior projections; and when preſſed forward, the indented ſpaces on its point being unequal, will force the ſliders to unequal diſtances from their bearers; bringing the notches expreſſed on their exterior projections in a direct line with each other, in a manner ſimilar to that by which the effect is produced upon the levers in the former lock. When the key is withdrawn, and the ſliders reſume their ſtations by the preſſure of the ſprings, the diſpoſition of the notches muſt be irregular in the ſame proportion that the indentations on the point of the key are unequal; and they muſt neceſſarily fall again into a ſtraight line when preſſed by the key.

Fig. 6. ſhows the barrel completely fitted for action. Its interior end is caped with a plate, which unites its compartments, and confines the ſprings and ſliders within the cells to which they belong. From that plate proceeds the point A, which repreſents the lever by which the bolt is projected or withdrawn, according to the direction in which the machine performs its revolution.

Fig. 8. ſhows the flat ſurface of a thin plate, correſponding in its office with the part C of the former lock. The ſpace cut in its centre is exactly fitted to the ſpherical ſurface of the barrel; the circle deſcribing its circumference, and the notches cut on its edge coinciding with the projections of the ſliders. The barrel, when encircled with this plate at the middle of its ſpherical ſurface, has its motion totally ſuſpended till the notches on the projections of the ſliders are forced, by the preſſure of the key, into a line with each other: a groove being thus formed on the ſpherical ſurface of the barrel parallel to, and coinciding with, the edge of the plate, the machine is at liberty to perform a revolution in any direction, but returns to its confined ſtate when the key is withdrawn.

The parts of the movement being thus united, the interior end of the barrel is depoſited in a bed repreſented fig. 9. To this it is faſtened at the angles of the plate repreſented fig. 8. by which the barrel is encircled. The ſtation of the bolt is at A; the lever which acts upon it being projected on the other ſide. Fig. 10. is a cap or maſk which covers the face of the movement, and completes the lock.

On this lock our author obſerves, that it is excellent for ſtreet doors: “for no method of robbery (ſays he) is more practiſed, than gaining admittance into houſes by thoſe keys, which as is well known, may be procured at the old iron ſhops to fit almoſt any lock in uſe. Such robberies are generally committed where the ſervants are allowed to take the key with them when ſent on errands, it being impracticable while the key is fixed in the lock. The variations, by which the production of correſpondent keys is avoided, have two ſources: the one ariſing from the changes that may be made in the diſpoſition of the levers; the other from the number of points contained on the projected ſurface of each lever; by which the poſition of its notch may, in the ſmalleſt degree, be varied.

“The variations producible in the diſpoſitions of ſix figures only, are 720: theſe, being progreſſively multiplied by additional figures, will increaſe by aſtoniſhing degrees; and eventually ſhow, that a lock containing twelve levers will admit of 479,001,600 changes; which, with the addition of another lever, will increaſe to 6,227,020,800. Theſe being again multiplied by the number of changes which the projected ſurface of the levers will admit in the diſpoſition of the notches, their amount will exceed numeration, and may therefore be properly ſaid to be infinite. The ſlighteſt inſpection will at once ſhow, that their conſtruction precludes all poſſibility of obtaining an impreſſion of their internal parts, which is neceſſary for the fabrication of a falſe key; for it will be eaſily ſeen, that the poſitions into which the levers are forced by the preſſure of the key in opening the lock, can no more be aſcertained when the key is withdrawn, than the lock can be copied from its impreſſion on a ſeal, or the courſe of a ſhip be [illegible] by tracing it on the ſurface of the [illegible]. But inviolable ſecurity is not the only excellence they poſſeſs; the ſimplicity of their principle gives them likewiſe a great advantage over locks that are more complicated, in point of duration; for their eſſential parts being ſubject to no friction, nor expoſed to any poſſible accident from without, they will be leſs affected by uſe, and leſs liable to ſtand in need of repair."

Lock, or Locks, in inland navigations, the general name for all thoſe works of wood or ſtone made to confine and raiſe the water of a river: the banks alſo which are made to divert the courſe of a river, are called by theſe names in ſome places. But the term *lock* is more particularly appropriated to expreſs a kind of canal encloſed between two gates; the upper called by workmen the ſluice gate, and the lower called the flood gate. Theſe ſerve in artificial navigations to confine the water, and render the paſſage of boats eaſy in paſſing up and down the ſtream. See Canal.

LOCKE, John, an eminent Engliſh philoſopher and writer in the latter end of the 17th century, was ſon of Mr John Locke of Pensford in Somerſetſhire, and born at Wrington near Briſtol in 1632. He was ſent to Chriſt-church in Oxford; but was highly diſſatisfied with the common courſe of ſtudies then purſued in the univerſity, where nothing was taught but the Ariſtotelian philoſophy; and had a great averſion to the diſputes of the ſchools then in uſe. The firſt books which gave him a reliſh for philoſophy were the writings of Des Cartes: for though he did not always approve of his notions, yet he thought he wrote with great perſpicuity. He applied himſelf with vigour to his ſtudies, particularly to phyſic, in which he gained a conſiderable knowledge, though he never practiſed it. In 1664, he went to Germany as ſecretary to Sir William Swan, envoy from the Engliſh court to the elector of Brandenburg and ſome other German princes. In leſs than a year, he returned to England; where, among other ſtudies, he applied himſelf to that of natural philoſophy, as appears from a regiſter of the changes of the air, which he kept at Oxford from June 24. 1666, to March 28. 1667. There he became acquainted with the lord Aſhly, afterwards earl of Shafteſbury, who introduced him into the converſation of ſome of the moſt eminent perſons of that time. In 1670, he began to form the plan of his Eſſay on Human Underſtanding; but his employments and avocations prevented him from finiſhing it then. About this time he became a member of the Royal Society. In 1672, his patron, now earl of Shafteſbury, and lord chancellor of England, appointed him ſecretary of the preſentations, which place he held till the earl reſigned the great ſeal. In 1673, he was made ſecretary to a commiſſion of trade, worth 500l. a year; but that commiſſion was diſſolved in 1674. The earl of Shafteſbury being reſtored to favour, and made preſident of the council in 1679, ſent for Mr Locke to London: but that nobleman did not continue long in his poſt, being ſent priſoner to the tower; and after his diſcharge retired to Holland in 1682.

Mr Locke followed his patron thither. He had not been abſent from England a year, when he was accuſed at court of having written certain tracts againſt the government, which were afterward diſcovered to be written by another perſon; and in November 1684, he was deprived of his place of ſtudent in Chriſt-church. In 1685, the Engliſh envoy at the Hague demanded him and 83 other perſons to be delivered up by the ſtates general: upon which he lay concealed till the year following; and during this time formed a weekly aſſembly with Mr Limborch, Mr Le Clerc, and other learned men at Amſterdam. In 1689 he returned to England in the fleet which conveyed the princeſs of Orange; and endeavoured to procure his reſtoration to his place of ſtudent of Chriſt-church, that it might appear from thence that he had been unjuſtly deprived of it: but when he found the college would admit him only as a ſupernumerary ſtudent, he deſiſted from his claim.

Locke.

Being eſteemed a ſufferer for revolution principles, he might eaſily have obtained a more profitable poſt; but he contented himſelf with that of commiſſioner of appeals, worth 200l. a-year, which was procured for him by the Lord Mordaunt; and about the ſame time he was offered an appointment in a diplomatic character, but the infirm ſtate of his health prevented him from accepting it. He went afterwards to reſide with Sir Francis Maſham and his lady, at Oates in Eſſex, about 25 miles from London, where he ſpent moſt of his time during the reſt of his life. In this agreeable ſituation he enjoyed that health and vigour which enabled him to exert his talents in writing on political ſubjects. Hence he appears in defence of the revolution in one piece; and conſidering the great national concern at that time, the ill ſtate of the ſilver coin, and propoſing remedies for it, in others. Hence he was made a commiſſioner of trade and plantations in 1695, which engaged him in the immediate buſineſs of the ſtate; and with regard to the church, he publiſhed a treatiſe the ſame year, to promote the ſcheme which King William had much at heart, of a comprehenſion with the diſſenters. This, however, drew him into one controverſy; which was ſcarcely ended, when he entered into another in defence of his eſſay, which held till 1698; ſoon after which the aſthma, his conſtitutional diſorder, increaſing with his years, began to ſubdue him; and he became ſo infirm, that in 1700 he reſigned his ſeat at the board of trade, becauſe he could no longer bear the air of London ſufficient for a regular attendance upon it. After this reſignation he continued altogether at Oates; in which retirement he employed the remaining laſt years of his life entirely in the ſtudy of the Holy Scriptures.

He died in 1704, aged 73. His writings will immortalize his name. The earl of Shafteſbury, author of the Characteriſtics, though in one place he ſpeaks of Mr Locke's philoſophy with ſeverity; yet obſerves, concerning his Eſſay on the Human Underſtanding, in general, "that it may qualify men as well for buſineſs and the world, as for the ſciences and the univerſity." His Diſcourſes on Government, Letters on Toleration, and Commentaries on ſome of St Paul's Epiſtles, are alſo held in much eſteem.

LOCKED JAW. See Medicine *Index*.

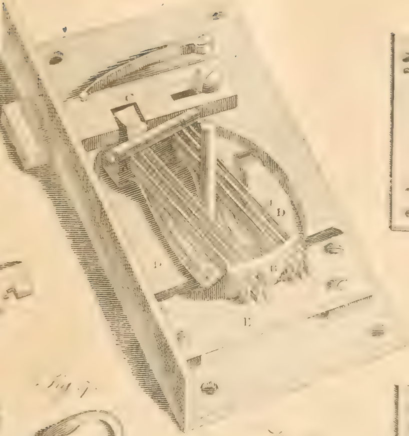
LOCKMAN, an officer in the Iſle of Man, who executes the orders of government, much like our under ſheriff.

Lockman, an eaſtern philoſopher. See Lokman.

LOCLE, a ſmall town in a diſtrict of the ſame

name

Fig. 1.



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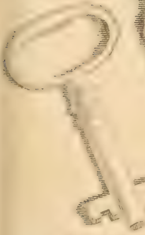

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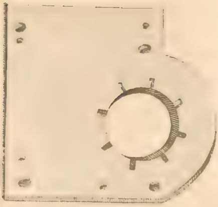

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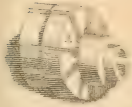

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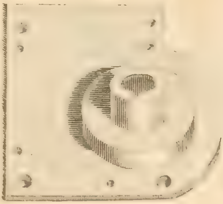

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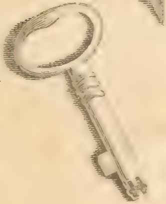

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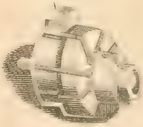
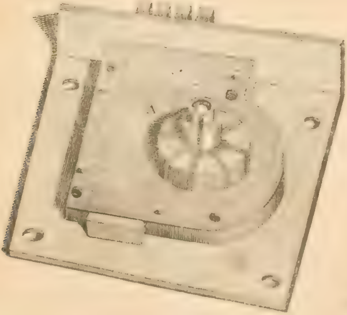


Fig. 4.

Fig. 5.

Fig. 9.



[illegible] sculp.

name in Switzerland, adjacent to Neufchatel and Vallengin, and united with another named *La Chaux de Fond*. Both theſe diſtricts occupy ſome valleys formed by the mountains of Jura; the greateſt part of which not many years ago was one continued foreſt, though now converted into fine paſture ground filled with flouriſhing villages. The inhabitants of theſe diſtricts are remarkable for their induſtry, and excel in many mechanical arts, particularly in watch and clock making; 40,000 watches, it is ſaid, are made in a year.

LOCRI, or *Locri Epizephyrii*, in *Ancient Geography*, a town on the Ionian ſea near the promontory Zephyrium. The people were called *Locri* and *Locrenſes*, and are ſaid to be the firſt who uſed a code of written laws, compiled by Zaleucus from the laws of the Cretans and others.

LOCRIS, the diſtrict or territory of the Locri.

LOCRIS, a country of Achaia in Greece; twofold, and divided by Mount Parnaſſus. The Hither was occupied by the Locri Ozolæ, called alſo *Zephyrii*, or Weſtern, contained between Ætolia and Phocis. The Farther Locris lay beyond Parnaſſus, running out towards Thermopylæ, and reaching to the Euripus of Eubœa; occupied by the Locri Opuntii, and Epicnemidii, who were called the Eaſtern Locri.

LOCUS GEOMETRICUS, denotes a line by which a local or indeterminate problem is ſolved.

A *locus* is a line, any point of which may equally ſolve an indeterminate problem. Thus if a right line ſuffice for the conſtruction of the equation, it is called *locus ad rectum*; if a circle, *locus ad circulum*; if a parabola, *locus ad parabolam*; if an ellipſis, *locus ad ellipſin*: and ſo of the reſt of the conic ſections.

LOCULAMENTA, and LOCULI, in *Botany*, cells or pockets: The internal diviſions of a capſule, or other dry ſeed-veſſel, encloſing the ſeeds.

LOCUST. See GRYLLUS, ENTOMOLOGY *Index*.

Locust-Eaters. See ACRIDOPHAGI.

American Locust, or *Frog-hopper*. See CICADA, ENTOMOLOGY *Index*.

Locust-Tree. See HYMENÆA and GLEDITSIA, BOTANY *Index*.

LOCUTIUS, in mythology, the god of ſpeech among the Romans, called by Livy *Aius Locutius*.

LOCUTORIUM. A hall or apartment in monaſteries where the monks and other religious met after dinner to converſe together.

LODE, in *Mining*. See LOAD.

LODGMENT, in military affairs, a work made by the beſiegers in ſome part of a fortification (after the beſieged have been driven out), to maintain it, and be covered from the enemy's fire.

LOG, in the Jewiſh antiquities, a meaſure which held a quarter of a cab, and conſequently five-ſixths of a pint. There is mention of a log, 2 Kings vi. 25. under the name of *a fourth part of a cab*. But in Leviticus the word log is often met with, and ſignifies that meaſure of oil which lepers were to offer at the temple after they were cured of their diſeaſe. Dr Arbuthnot ſays, that the log was a meaſure of liquids, the ſeventy-ſecond part of the bath or ephah, and twelfth part of the hin, according to all the accounts of the Jewiſh writers.

LOG, a ſea term, ſignifying a ſmall piece of timber *a*, of a triangular, ſectoral, or quadrantal figure, on board a ſhip, generally about a quarter of an inch thick, and five or ſix inches from the angular point to the circumference. It is balanced by a thin plate of lead, nailed to the arch, or circular ſide, ſo as to ſwim perpendicularly in the water.

Log-Line, a little cord, or line, about a hundred and fifty fathoms long, faſtened to the log by means of two legs *a b* (fig. 4.), one of which paſſes through a hole at the corner, and is knotted on the oppoſite ſide, while the other leg is attached to the arch by a pin fixed into another hole, ſo as to draw out occaſionally. By theſe legs the log is hung in equilibrio; and the line thus annexed to it is wound round a reel fixed for that purpoſe in the gallery of the ſhip.

Plate CCXCVII.

This line, from the diſtance of about ten, twelve, or fifteen fathoms off the log, has certain knots or diviſions, which ought to be at leaſt fifty feet from each other; though it was the common practice at ſea not to have them above forty-two feet aſunder.

The length of each knot ought to be the ſame part of a ſea mile as half a minute is of an hour; and admitting the meaſurement of Mr Norwood, who makes a degree on a great circle of the earth to contain 367,200 Engliſh feet, or about $69\frac{1}{2}$ Engliſh ſtatute miles, and therefore $\frac{1}{60}$th part of it, or a nautical mile, will be 6120 feet; $\frac{1}{120}$th of 6120, or 51 feet, ſhould be length of each knot. But becauſe it is ſafer to have the reckoning rather before the ſhip than after it, therefore fifty feet may be taken as the proper length of each knot. The knots are ſometimes made to conſiſt only of forty-two feet each, even in the preſent practice; and this method of dividing the log-line was founded on the ſuppoſition that ſixty miles, each of 5000 Engliſh feet, made a degree; for $\frac{1}{120}$ of 5000 is $41\frac{2}{3}$, or, in round numbers, 42 feet. Mariners, rather than quit the old way, though known to be erroneous, uſe glaſſes for half minute ones, that run but 24 or 25 ſeconds. They have alſo uſed a line of 45 feet to 30 ſeconds, or a glaſs of 28 ſeconds to 42 feet. When this is the caſe, the diſtance between the knots ſhould be corrected by the following proportion: as 30 is to 50; ſo is the number of ſeconds of the glaſs to the diſtance between the knots upon the line. The heat or moiſture of the weather has often a conſiderable effect upon the glaſs, ſo as to make it run ſlower or faſter; it ſhould, therefore, be frequently tried by the pendulum in the following manner. On a round nail hang a ſtring that has a muſket ball fixed to one end, carefully meaſuring between the centre of the ball and the ſtring's loop over the peg $39\frac{1}{4}$ inches, being the length of a ſecond pendulum; then ſwing it, and count one for every time it paſſes under the peg, beginning at the ſecond time it paſſes and the number of ſwings made during the time the glaſs is running out ſhows the ſeconds it contains. The line alſo is liable to relax and ſhrink, and ſhould therefore be occaſionally meaſured.

The uſe of the log and line is to keep account and make an eſtimate of the ſhip's way or diſtance run; which is done by obſerving the length of line unwound in half a minute's time, told by a half-minute glaſs; for ſo many knots as run out in that time, ſo many miles the ſhip ſails in an hour. Thus, if there be four knots veered out in half a minute, the ſhip is computed to run four miles an hour.

Log.

The author of this advice for meaſuring the ſhip's way is not known; and no mention of it occurs till the year 1607, in an Eaſt India voyge publiſhed by Purchas; but from that time its name occurs in other voyages among his collections; and henceforward it became famous, being taken notice of both by our own authors and by foreigners; as by Gunter in 1623; Snellius in 1624; Metius in 1631; Oughtred in 1633; Herigone in 1634; Saltonſtall in 1636; Norwood in 1637; Fournier in 1643; and almoſt by all the ſucceeding writers on navigation of every country.

To Heave the Log, as they call it, they throw it into the water on the lee ſide, letting it run till it comes without the eddy of the ſhip's wake; then one holding a half-minute glaſs, turns it up juſt as the firſt knot, or the mark from which the knots begin to be reckoned, turns off the reel (fig. 2.) or paſſes over the ſtern. As ſoon as the glaſs is out, the reel is ſtopped, and the knots run off are told, and their parts eſtimated.

It is uſual to heave the log once every hour in ſhips of war and Eaſt Indiamen, and in all other veſſels once in two hours, allowance being made for the wind having increaſed or abated in the intervals.

The log is a very precarious way of computing, and muſt always be corrected by experience, there being much uncertainty from the motions of the ſhip, the winds of variable force, the friction of the reel and lightneſs of the log in the courſe of the current. Yet this is a much more exact way of computing than any other in uſe; much preferable certainly to that of the Spaniards and Portugueſe, who gueſſed at the ſhip's way by the running of the froth or water by the ſhip's ſide; or to that of the Dutch, who uſed to heave a chip overboard, and to number the paces they walk on the deck while the chip ſwims between any two marks or bulk heads on the ſide.

Compound Log. The above-mentioned errors, and particularly the log's being ſubject to drive with the motion of the water at its ſurface, whereas the experiment requires it to be fixed in the place where it is when the mark commencing the knots goes off the reel, have been conſidered, and many methods propoſed to remove or to leſſen them. M. Bouguer propoſed the following method. Take for the log a conical piece of wood, which fix to the log line paſſed through or along its axis, at about 40, 50, or 60, or more feet, from one end; and to this end fix the diver, which is a body formed of two equal ſquare pieces of tin, or of thin iron plate, fixed at right angles to one another along their diagonals; and its ſize ſo fitted to that of the cone, that the whole may float. A cone of three inches diameter in the baſe, and of ſix inches in the ſlant height, is propoſed by M. Bouguer to ſuit a diver made of plates about $9\frac{3}{4}$ inches ſquare; the interſection of the diagonals is joined to the log line, and the loop and peg fixed as in the common log. However, it has been found, that no kind of wood uſed in Britiſh dock yards, when formed into a cone of the above dimenſions, will float a diver made of ſtout tin plates, one ſide of the ſquare being $9\frac{3}{4}$ inches. Such a diver weighing $1\frac{7}{8}$lb. avoirdupois, required to float it a cone of five inches diameter and twelve inches on the ſlant ſide, ſo as the point of the cone, which was made of light fir, ſhould juſt appear above the water. Now, ſuppoſing one ſide of ſuch a ſquare tin diver to be about ten inches, and made of plates only two-thirds of the thickneſs of the former, ſuch a diver would weigh, with its ſolder, about 20 ounces, and can be floated by a light fir cone of four inches diameter in the baſe, and ten inches in the ſlant height or length; and ſuch a compound log might perhaps be found on trial to be affected by about as much again as that propoſed by M. Bouguer; and conſequently the difference between the numbers given by the common log and compound log, muſt be augmented by two thirds of itſelf for the neceſſary correction, as below. When the compound log of Bouguer, above deſcribed, is hove overboard, the diver will ſink too deep to be much affected by the current or motion of water at the ſurface, and the log will thereby keep more ſteadily in the place where it firſt fell; and conſequently the knots run off the reel will ſhow more accurately the ſhip's rate of ſailing. As the common log is affected by the whole motion of the current, ſo this compound log will feel only a part thereof, viz. ſuch a part nearly as the reſiſtance of the cone is to the reſiſtance of the diver; then the reſiſtances of the above cone and diver are about as 1 to 5; and conſequently this log will drive but one-fifth part of what the common log would do; and ſo the ſhip's true run will be affected by one-fifth only of the motion of the waters. To obtain the true rate of ſailing, it will be proper to heave alternately, hour and hour, the common log, and this compound log; then the difference of their knots run off, augmented by its one-fourth part, is the correction; which applied to the knots of the common log, will give the ſhip's true rate of ſailing at the middle time between the hours when theſe logs were hove. The correction is additive when the compound log's run is the greateſt, otherwiſe it is ſubtractive. To find the courſe made good: increaſe the obſerved angle between the log lines by one-fourth part; and this gives the correction to be applied to the apparent courſe, or the oppoſite of that ſhown by the common log; the correction is to be applied to the $\left\{\begin{array}{c}\text{right}\\ \text{left}\end{array}\right\}$ of the apparent courſe, when the bearing of the common log is to the $\left\{\begin{array}{c}\text{left}\\ \text{right}\end{array}\right\}$ of the compound log. Or thus: the lengths run off both logs, together with their bearings, being known; in a card or compaſs apply the knots run off, taken from a ſcale of equal parts along their reſpective bearings from the centre; join the ends; and in this line produced, on the ſide next the compound log's length, take one-fourth of the interval; then a line drawn from the end, thus produced, to the centre of the card, will ſhow the true courſe and diſtance made good. When a current, ſuch as a tide, runs to any depth, the velocity of that current may be much better aſcertained by the compound log than by the common one, provided the diver does not deſcend lower than the run of the current; for as thoſe ſhips which are deepeſt immerged, drive faſteſt with the tide; ſo the diver, by being acted on below, as well as the log on the ſurface, their joint motion will give the total effect of the current's motion better than what could be derived from the motion at the ſurface only. Alſo, by ſuch a compound log, the depth to which any current runs may be eaſily tried.

Mem. Acad. Scien. 1747.

Other Logs. We have an account in the voyage to the

Plate C[illegible]CVII.

Log.

Fig. 1.

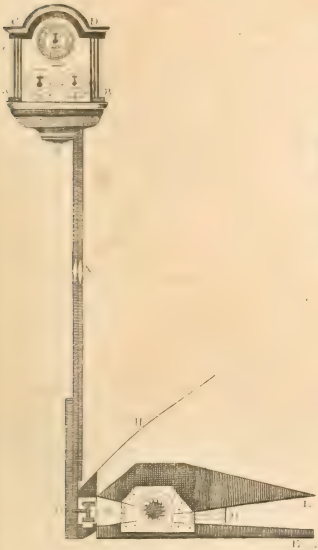
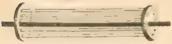


Fig. 2.



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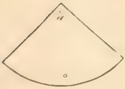
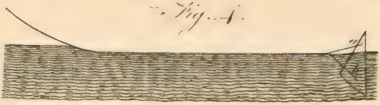


Fig. 4.



Logarithms.

Fig. 2.

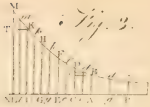
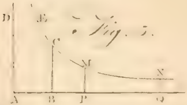


Fig. 5.



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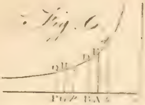


Fig. 7.

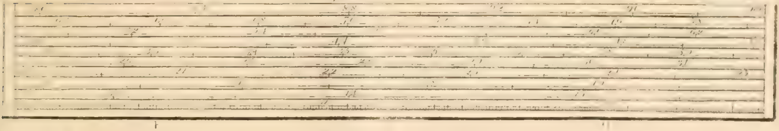


Fig. 8.

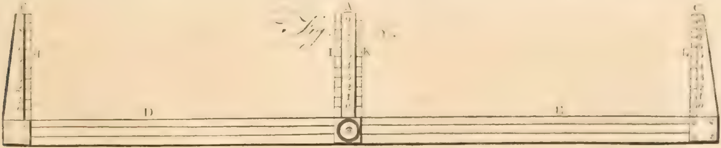


Fig. 9.

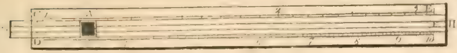


Fig. 10.

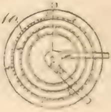
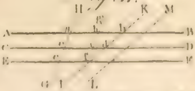


Fig. 11.



[illegible]

North Pole, p. 97. of two other logs, which were tried by Captain Phipps: one invented by Mr Ruſſel, the other by Foxon; both conſtructed upon this principle, that a ſpiral, in proceeding its own length in the direction of its axis through a reſiſting medium, makes one revolution round the axis; if, therefore, the revolutions of the ſpiral are regiſtered, the number of times it has gone its own length through the water will be known. In both theſe the motion of the ſpiral in the water is communicated to the clockwork within board, by means of a ſmall line faſtened at one end to the ſpiral, which tows it after the ſhip, and at the other to a ſpindle, which ſets the clockwork in motion. That invented by Mr Ruſſel has a half ſpiral of two threads, made of copper, and a ſmall dial with clockwork, to regiſter the number of turns of the ſpiral. The other log has a whole ſpiral of wood with one thread, and a larger piece of clockwork with three dials, two of them to mark the diſtance, and the other divided into knots and fathoms, to ſhow the rate by the half minute glaſs, for the convenience of comparing it with the log. This kind of log will have the advantage of every other in ſmooth water and moderate weather; and it will be uſeful in finding the trim of a ſhip when alone, in ſurveying a coaſt in a ſingle ſhip, or in meaſuring diſtances in a boat between headlands and ſhoals; but it is ſubject to other inconveniences, which will not render it a proper ſubſtitute for the common log.

Perpetual Log, a machine ſo called by its inventor, Mr Gottlieb of London, is intended for keeping a conſtant and regular account of the rate of a ſhip's velocity in the interval of heaving the log.

Plate CXCVII.

Fig. 1. is a repreſentation of the whole machine; the lower part of which, EFG, is fixed to the ſide of the keel; H repreſenting only the boundary line of the ſhip's figure. EF are the ſection of a wooden external caſe, left open at the ends KL, to admit the paſſage of the water during the motion of the ſhip. At M is a copper grating, placed to obſtruct the entrance of any dirt, &c. into the machine. I is a ſection of a water wheel, made from 6 to 12 inches in diameter, as may be neceſſary, with floatboards upon its circumference, like a common water wheel, that turn by the reſiſtance of the water paſſing through the channel LK. It turns upon a ſhouldered axis, repreſented by the vertical ſection at K. When the ſhip is in motion, the reſiſtance of the water through the channel LK turns round the wheel I. This wheel, by means of a pinion, is connected with and turns the rod contained in the long copper tube N. This rod, by a pinion fixed at its upper extremity, is connected with and turns upon the whole ſyſtem of wheels contained in the dial of the caſe ABCD. This dial, by means of the copper tube N, may be fixed to any convenient place aboard the ſhip. In the front of the dial are ſeveral uſeful circular graduations, as follow: The reference by the dotted line A has a hand which is moved by the wheels within, which points out the motion of the ſhip in fathoms of 6 feet each. The circle at B has a hand ſhowing the knots, at the rate of 48 feet for each knot: and is to be obſerved with the half-minute glaſs at any time. The circle at C has a ſhort and a long hand; the former of which points out the miles in land meaſure, and the latter or longer the number of knots contained in each mile, viz. 128, which is in the ſame proportion to a mile as 60 minutes to the hour in the reckoning. At *e*, a ſmall portion of a circle is ſeen through the front plate called the *regiſter;* which ſhows, in the courſe of 24 hours (if the ſhip is upon one tack), the diſtance in miles that ſhe has run; and in the 24 hours the mariner need take but one obſervation, as this regiſter ſerves as an uſeful check upon the fathoms, knots, and miles, ſhown upon the two other circles.

f Is a plate ſhowing 100 degrees or 6000 miles, and alſo acts as another regiſter or check; and is uſeful in caſe of any miſtake being made in obſerving the diſtance run by the other circles. The reckoning by theſe circles, without fear of miſtake, may therefore be continued to nearly 12,000 miles.

A communication from this machine may eaſily be made to the captain's bedſide, where by touching a ſpring only, a bell in the head ABCD will ſound as many times in a half minute as the ſhip ſails miles in an hour.

Log-Board, a ſort of table, divided into ſeveral columns, containing the hours of the day and night, the direction of the winds, the courſe of the ſhip, and all the material occurrences that happen during the 24 hours, or from noon to noon; together with the latitude by obſervation. From this table the officers of the ſhip are furniſhed with materials to compile their journals.

Log-Book, a book into which the contents of the log-board is daily copied at noon, together with every circumſtance deſerving notice that may happen to the ſhip, either at ſea or in a harbour. See NAVIGATION.

LOGARITHMS.

INTRODUCTION.

THE labour and time required for performing the arithmetical operations of multiplication, diviſion, and the extraction of roots, were at one time conſiderable obſtacles to the improvement of various branches of knowledge, and in particular the ſcience of aſtronomy. But about the end of the 16th century, and the beginning of the 17th, ſeveral mathematicians began to conſider by what means they might ſimplify theſe operations, or ſubſtitute for them others more eaſily performed. Their efforts produced ſome ingenious contrivances for abridging calculations; but of theſe the moſt complete by far was that of *John Napier Baron of Merchiſton* in Scotland, who invented a ſyſtem of numbers called *logarithms*, which were ſo adapted to the numbers to be multiplied, or divided, that theſe being arranged in the form of a table, each oppoſite to the number called its logarithm, the product of any two numbers in the table was found by the addition of their logarithms; and, on the contrary, the quotient ariſing from the diviſion of one number by another was found by the ſubtraction of the logarithm of the diviſor from that of the dividend; and ſimilar ſimplifications took place in the ſtill more laborious operations of involution and evolution. But before we proceed to relate more particularly the circumſtances of this invention, it will be proper to give a general view of the nature of logarithms, and of the circumſtances which render them of uſe in calculation.

Let there be formed two ſeries of numbers, the one conſtituting a geometrical progreſſion, the firſt term of which is unity or 1, and the common ratio any number whatever, and the other an arithmetical progreſſion, the firſt term of which is 0, and the common difference alſo any number whatever; (but as a particular example we ſhall ſuppoſe the common ratio of the geometrical ſeries to be 2, and the common difference of the arithmetical ſeries 1), and let the two ſeries be written oppoſite to each other in the form of a table, thus:

Geom. Prog.		Arith. Prog.
1	-	0
2	-	1
4	-	2
8	-	3
16	-	4
32	-	5
64	-	6
128	-	7
256	-	8
512	-	9
1024	-	10
2048	-	11
4096	-	12
&c.		&c.

The two ſeries being thus arranged, the terms in the arithmetical ſeries are called the *logarithms* of the correſponding terms of the geometrical ſeries; that is, 0 is the logarithm of 1, and 1 is the logarithm of 2, and 2 is the logarithm of 4, and 3 that of 8, and ſo on.

From the manner in which the two ſeries are related to each other, it will readily appear by induction that the logarithms of the terms of the geometrical ſeries have the two following properties:

1. The ſum of the logarithms of any two numbers or terms in the geometrical ſeries is equal to the logarithm of that number, or term of the ſeries, which is equal to their product.

For example, let the terms of the geometrical ſeries be 4 and 32; the terms of the arithmetical ſeries correſponding to them (that is, their logarithms) are 2 and 5; now the product of the numbers is 128, and the ſum of their logarithms is 7; and it appears by inſpection of the two ſeries, that the latter number is the logarithm of the former, agreeing with the propoſition we are illuſtrating. In like manner, if the numbers or terms of the geometrical ſeries be 16 and 64, the logarithms of which are 4 and 6, we find from the table that 10=4+6 is the logarithm of 1024=16×64; and ſo of any other numbers in the table.

2. The difference of the logarithms of any two numbers, or terms of the geometrical ſeries, is equal to the logarithm of that term of the ſeries which is equal to the quotient ariſing from the diviſion of the one number by the other.

Take for example the terms 128 and 32, the logarithms of which are 7 and 5; the greater of theſe numbers divided by the leſs is 4, and the difference of their logarithms is 2; and by inſpecting the two ſeries, this laſt number will be found to be the logarithm of the former. In like manner, if the terms of the geometrical ſeries be 1024 and 16, the logarithms of which are 10 and 4, we find that 1024÷16=64, and that 10—4=6; now it appears from the table that the latter number, viz. 6, is the logarithm of the former 64.

Theſe two properties of logarithms, the ſecond of which indeed is an immediate conſequence of the firſt, enable us to find with great facility the product or the quotient of any two terms of a geometrical ſeries to which there is adapted an arithmetical ſeries, ſo that each number has its logarithm oppoſite to it, as in the preceding ſhort table. For it is evident, that to multiply two numbers we have only to add their logarithms, and oppoſite to that logarithm which is the ſum we ſhall find the product required. Thus, to multiply 16 by 128; to the logarithm of 16, which is 4, we add the logarithm of 128, which is 7, and oppoſite to the ſum 11, we find 2048, the product ſought. On the other hand, to divide any number in the table by any other number, we muſt ſubtract the logarithm of the diviſor from that of the dividend, and look for the remainder among the logarithms, and oppoſite to it we ſhall find the number ſought. Thus, to divide 2048 by 128, from 11, which is the logarithm of 2048 we ſubtract 7, the logarithm of 128, and oppoſite to the remainder 4 we find 16, the quotient ſought.

Let us now ſuppoſe any number of geometrical means to be interpoſed between each two adjoining terms of the preceding geometrical ſeries, and the ſame number of arithmetical means between every two adjoining terms of the arithmetical ſeries; then, as the reſults will ſtill be a geometrical and an arithmetical ſeries, the interpolated terms of the latter will be the logarithms of the correſponding terms of the former, and the two new ſeries will have the very ſame properties as the original ſeries.

If we ſuppoſe the number of interpolated means to be very great, it will follow that among the terms of the reſulting geometrical ſeries, ſome one or other will be found nearly equal to any propoſed number whatever. Therefore, although the preceding table exhibits the logarithms of 1, 2, 4, 8, 16, &c. but does not contain the logarithms of the intermediate numbers, 3, 5, 6, 7, 9, 10, &c. yet it is eaſy to conceive that a table might be formed by interpolation which ſhould contain, among the terms of the geometrical ſeries, all numbers whatever to a certain extent, (or at leaſt others very nearly equal to them) together with their logarithms. If ſuch a table were conſtructed, or at leaſt if ſuch terms of the geometrical progreſſion were found together with their logarithms, as were either accurately equal to, or coincided nearly with, all numbers within certain limits, (for example between 1 and 100000) then, as often as we had occaſion to multiply or divide any numbers contained in that table we might evidently obtain the products or quotients by the ſimple operations of addition and ſubtraction.

The firſt invention of logarithms has been attributed by ſome to *Longomontanus*, and by others to *Juſte Byrge*, two mathematicians who were cotemporary with *Lord Napier*; but there is no reaſon to ſuppoſe that either of theſe anticipated him, for *Longomontanus* never publiſhed any thing on the ſubject, although he lived thirty-three years after *Napier* had made known his diſcovery; and as to *Byrge*, he is indeed known to have printed a table containing an arithmetical and a geometrical progreſſion written oppoſite to each other, ſo as to form in effect a ſyſtem of logarithms of the ſame kind as thoſe invented by *Napier*, without however explaining their nature and uſe, although it appears from the title he intended to do ſo, but was probably prevented by ſome cauſe unknown to us. But this work was not printed till 1620, ſix years after Napier had publiſhed his diſcovery.

It is therefore with good reaſon that *Napier* is now univerſally conſidered as the firſt, and moſt probably as the only inventor. This diſcovery he publiſhed in the year 1614 in a book entitled *Mirifici Logarithmorum Canonis Deſcriptio*, but he reſerved the conſtruction of the numbers till the opinion of the learned concerning his invention ſhould be known. His work contains a table of the natural ſines and coſines, and their logarithms for every minute of the quadrant, as alſo the differences between the logarithmic ſines and coſines, which are in effect the logarithmic tangents. There is no table of the logarithms of numbers; but precepts are given, by which they, as well as the logarithmic tangents, may be found from the table of natural and logarithmic ſines.

In explaining the nature of logarithms, *Napier* ſuppoſes ſome determinate line which repreſents the radius of a circle to be continually diminiſhed, ſo as to have ſucceſſively all poſſible values, and thus to be equal to every ſine, one after another, throughout the quadrant. And he ſuppoſes this diminution to be effected by a point moving from one extremity towards the other extremity, (or rather ſome point very near it), with a motion that is not uniform, but becomes ſlower and ſlower, and ſuch, that if the whole time between the beginning and the end of the motion be conceived to be divided into a very great number of equal portions, the decrements taken away in each of theſe ſhall be to one another as the reſpective remainders of the line. According to this mode of conceiving the line to decreaſe, it is eaſy to ſhew that at the end of any ſucceſſive equal intervals of time from the beginning of the motion, the portions of the line which remain will conſtitute a decreaſing geometrical progreſſion.

Again, he ſuppoſes another line to be generated by a point which moves along it equably, or which paſſes over equal intervals of it in equal times. Thus the portions of the line generated at the end of any equal ſucceſſive intervals of time from the beginning of the motion will form a ſeries of quantities in arithmetical progreſſion. Now if the two motions be ſuppoſed to begin together, at the end of any equal intervals of time the remainders of the one line will form a ſeries of quantities in geometrical progreſſion, and the correſponding portions generated of the other line, will conſtitute a ſeries in arithmetical progreſſion, ſo that the latter will be the logarithms of the former. And as the terms of the geometrical progreſſion decreaſe continually from radius, which is the greateſt term, to 0, while the terms of the correſponding arithmetical progreſſion increaſe from 0 upwards, according to Napier's ſyſtem the logarithm of radius is 0, and the logarithms of the ſines from radius down to 0, are a ſeries of numbers increaſing from 0 to infinite.

The velocities or degrees of quickneſs with which the motions commence may have to each other any ratio whatever, and by aſſuming different ratios we ſhall have different ſyſtems of logarithms. Napier ſuppoſed the velocities to be equal; but the ſyſtem of logarithms produced in conſequence of this aſſumption having been found to have ſome diſadvantages, it has been long diſuſed, and a more convenient one ſubſtituted inſtead of it, as we ſhall preſently have occaſion to explain.

Napier's work having been written in Latin was tranſlated into Engliſh by *Mr Edward Wright*, an ingenious mathematician of that period, and the inventor of the principles of what is commonly though erroneouſly called *Mercator's ſailing*. The tranſlation was ſent to Napier for his peruſal, and returned with his approbation, and the addition of a few lines, intimating that he intended to make ſome alteration in the ſyſtem of logarithms in a ſecond edition. Mr Wright died ſoon after he received back his tranſlation; but it was publiſhed after his death, in the year 1616, accompanied with a dedication by his ſon to the Eaſt India Company, and a preface by *Henry Briggs*, who afterwards diſtinguiſhed himſelf ſo much by his improvement of logarithms. *Mr Briggs* likewiſe gave in this work the deſcription and draught of a ſcale which had been invented by *Wright*, as alſo various methods of his own for finding the logarithms of numbers, and the contrary, by means of Napier's table, the uſe of which had been attended with ſome inconvenience on account of its containing only ſuch numbers as were the natural ſines to every minute of the quadrant and their logarithms. There was an additional inconvenience in uſing the table, ariſing from the logarithms being partly poſitive and partly negative; the latter of theſe was, however, well remedied by *John Speidell* in his *New Logarithms*, firſt publiſhed in the year 1619, which contained the ſines, coſines, tangents, cotangents, ſecants, and coſecants, and given in ſuch a form as to be all poſitive; and the former was ſtill more completely removed by an additional table, which he gave in the ſixth impreſſion of his work, in the year 1624, and which contained the logarithms of the whole numbers 1, 2, 3, 4, &c. to 1000, together with their differences and arithmetical complements, &c. This table is now commonly called *hyperbolic logarithms*, becauſe the numbers ſerve to expreſs the areas contained between a hyperbola and its aſymptote, and limited by ordinates drawn parallel to the other aſymptote. This name, however, is certainly improper, as the ſame ſpaces may repreſent the logarithms of any ſyſtem whatever, (ſee Fluxions § 152. Ex. 5.)

In 1719 *Robert Napier*, ſon of the inventor of logarithms, publiſhed a ſecond edition of his father's *Logarithmorum Canonis Deſcriptio*. And along with this the promiſed *Logarithmorum Canonis Conſtructio*, and other pieces written by his father and Mr Briggs. An exact copy of the ſame two works in one volume was alſo printed in 1620 at Lyons in France. In 1618 or 1619 *Benjamin Urſinus*, mathematician to the elector of Brandenburg, publiſhed Napier's tables of logarithms in his *Curſus Mathematicus*, to which he added ſome tables of proportional parts; and in 1624 he printed his *Trigonometria*, with a table of natural ſines, and their logarithms of the Neperean kind and form, to every ten ſeconds of the quadrant.

In the ſame year, 1624, the celebrated *John Kepler* publiſhed at Marpurg logarithms of nearly the ſame kind, under the title of *Chilias Logarithmorum ad totidem Numeros Rotundos, præmiſſa Demonſtratione legitima Ortus Logarithmorum eorumque Uſus*, &c. and in the following year he publiſhed a ſupplement to this work. In the preface to this laſt he ſays, that ſeveral of the profeſſors of mathematics in Upper Germany, and more eſpecially thoſe of them who were ſomewhat advanced in years, and were grown averſe to new methods of reaſoning that carried them out of the old doctrines and principles with which habit had rendered them familiar, doubted in ſome degree whether Napier's demonſtration of the property of logarithms was perfectly true, and whether the application of them to trigonometrical calculations might not be unſafe and lead the calculator who ſhould truſt in them to erroneous reſults; and in either caſe, whether the doctrine were true or not, they conſidered Napier's demonſtration of it as illegitimate and unſatisfactory This opinion induced *Kepler* to compoſe the above-mentioned work, in which the whole doctrine is treated in a manner ſtrictly geometrical, and free from the conſiderations of motion which the German mathematicians had objected to (and not without reaſon) in Napier's mode of treating the ſubject.

On the publication of Napier's logarithms, *Mr Henry Briggs*, ſome time profeſſor of geometry in Greſham college London, and afterwards Savilian profeſſor of geometry at Oxford (whom we have already mentioned) applied himſelf with great earneſtneſs to their ſtudy and improvement, and it appears that he had projected at an early period that advantageous change in the ſyſtem which has ſince taken place. From the particular view which Napier took of the ſubject, and the manner in which he conceived logarithms to be generated, it happened that in his ſyſtem, the logarithms of a ſeries of numbers which increaſed in a decuple ratio, (as 1, 10, 100, 1000, &c.) formed a decreaſing arithmetical ſeries, the common difference of the terms of which was 2.3205851. But it occurred to Briggs that it would be better and more conformable to the received decimal notation, to adopt a ſyſtem in which the logarithms of the terms of ſuch a geometrical ſeries ſhould differ from each other by unity or 1. This idea Briggs communicated to the public in his lectures, and alſo to Napier himſelf. He even went twice to Edinburgh to ſee him, and to converſe with him upon the ſubject; and on his firſt viſit Napier told that he had alſo formerly thought of the ſame improvement, but that he choſe to publiſh the logarithms he had previouſly calculated, till ſuch time as his health and convenience would allow him to make others more commodious. And whereas in the change which Briggs propoſed, it was intended to make the logarithms of the ſines to increaſe from 0 (the logarithm of radius) to infinity, while the ſines themſelves ſhould decreaſe, it was ſuggeſted to him by Napier that it would be better to make them increaſe ſo that 0, inſtead of being the logarithm of radius, ſhould be the logarithm of 1; and that 100000, &c. ſhould be the logarithm of radius; and this Briggs admitted would be an improvement; and having changed the numbers he had already calculated ſo as to make them ſuit Napier's modification of his plan, he returned with them next year to Edinburgh, and ſubmitted them to his peruſal.

It appears therefore that Briggs was the inventor of this improved ſyſtem of logarithms which has ſince been univerſally adopted, and that the only ſhare that Napier had in it was his ſuggeſting to Briggs to begin with the low number 1, and to make the logarithms, or the artificial numbers, as Napier had always called them, to increaſe with the natural numbers, inſtead of decreaſing, which made no alteration in the figures, but only in their affections or ſigns, changing them from negative to poſitive.

On Briggs's return from Edinburgh, in 1617, he printed the firſt thouſand logarithms to eight places of figures, beſides the index, with the title of ***Logarithmorum Chilias prima;*** but theſe ſeem not to have been publiſhed till after the death of Napier, which happened in 1618, for in his preface he expreſſes a hope, that the circumſtances which led to a change in the ſyſtem would be explained in Napier's poſthumous work, which was preſently to appear. But although Napier had intimated in a note he had given in Wright's tranſlation of the ***Canon Mirificus***, as well as his ***Rabdologia***, printed in 1617, that he intended to alter the ſcale, yet he altogether omits to ſtate that Briggs either was the firſt to think of this improvement, or at leaſt to publiſh it to the world. And as the ſame ſilence on this point was obſerved in Napier's poſthumous work publiſhed in 1619 by his ſon, Briggs took occaſion in the preface to his ***Arithmetica Logarithmica*** to aſſert his claims to the improvement he had now carried into execution.

The ſtudied ſilence which Napier ſeems to have obſerved reſpecting the improvement of the ſyſtem, which Briggs had communicated to him, has given juſt reaſon to ſuſpect that he wiſhed to be conſidered as the author of that improvement, as well as the original inventor. But although it is poſſible that he thought of it as ſoon as Briggs, it would ſeem to have been no more than juſtice, if, when announcing his intended change of the ſcale, he had acknowledged that the ſame idea had occurred to Briggs as well as to himſelf.

In 1620 ***Mr Edmund Gunter*** publiſhed his ***Canon of Triangles***, which contains the artificial or logarithmic ſines and tangents to every minute to ſeven places of figures beſides the index, the logarithm of radius being 10. Theſe logarithms are of the kind which had been agreed upon between Napier and Briggs, and they were the firſt tables of logarithmic ſines and tangents that were publiſhed of this ſort. Gunter alſo in 1623 reprinted the ſame in his book *de Sectore et Radio*, together with the *Chilias prima* of Briggs; and in the ſame year he applied the logarithms of numbers, ſines, and tangents, to ſtraight lines drawn upon a ruler. This inſtrument is now in common uſe for navigation and other purpoſes, and is commonly called *Gunter's ſcale*.

The

Introduction.

The diſcoveries in Logarithms were firſt carried to France by *Mr Edmund Wingate*, but not firſt of all as he ſays in the preface to his book. He publiſhed at Paris in 1624 two ſmall tracts in the French language upon logarithms, and theſe were reprinted with improvements at London in 1626.

In the year 1624, Briggs publiſhed his *Arithmetica Logarithmica*, a ſtupendous work conſidering the ſhort time he had been in preparing it. He here gives the logarithms of 30000 natural numbers to fourteen places of figures, beſides the index; namely, from 1 to 20000, and from 90000 to 100000, together with the differences of the logarithms. He alſo gives an ample treatiſe on their conſtruction and uſe, and he earneſtly ſolicits others to undertake the computation of the intermediate numbers, offering to give inſtructions, and paper ready ruled for that purpoſe, to any perſons inclined to contribute to the completion of ſo valuable a work. By this invitation he had hopes of collecting materials for the logarithms of the intermediate 70000 numbers, while he ſhould employ his time upon the Canon of Logarithmic ſines and tangents, and ſo carry on both works at once.

Soon after this, *Adrian Vlacq* or *Flack* of Gouda in Holland completed the intermediate 70 chiliads, and republiſhed the *Arithmetica Logarithmica* in 1627 and 1628, with theſe intermediate numbers, making in all, the logarithms of all numbers to 100,000, but only to 10 places of figures. To theſe was added a table of artificial ſines, tangents, and ſecants, to every minute of the quadrant.

Briggs himſelf lived alſo to complete a table of logarithmic ſines and tangents, to the 100th part of every degree, to fourteen places of figures beſides the index, together with a table of natural ſines to the ſame parts to fifteen places, and the tangents and ſecants of the ſame to ten places, with the conſtruction of the whole. But his death, which then happened, prevented him from completing the application and uſes of them. However, when dying, he committed the performing of this office to his friend *Henry Gellibrand*, who accordingly added a preface, and the application of the logarithms to plane and ſpherical trigonometry. The work was called *Trigonometria Britannica*, and was printed at Gouda in the year 1633 under the care of *Adrian Vlack*.

In the ſame year, 1633, *Adrian Vlack* printed a work of his own, called *Trigonometria Artificialis, ſive Magnus Canon Triangulorum Logarithmicus ad Decadas Secundorum Scrupulorum Conſtructus*. This work contains the logarithmic ſines and tangents to 10 places of figures, with their differences for every 10 ſeconds in the quadrant. It alſo contains Briggs's table of the firſt 20000 logarithms to ten places, beſides the index, with their differences; and to the whole is prefixed a deſcription of the tables and their applications, chiefly extracted from Briggs's *Trigonometria Britannica*, which we have already mentioned.

Gellibrand publiſhed alſo, in 1635, *An Inſtitution Trigonometrical*, containing the logarithms of the firſt 10,000 numbers, with the natural ſines, tangents, and ſecants, and the logarithmic ſines and tangents for degrees and minutes; all to ſeven places of figures beſides the index.

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The writers, whoſe works we have hitherto noticed, were for the moſt part computers of logarithms. But the ſyſtem beſt adapted to practice being now well aſcertained, and the labour of conſtructing the table accompliſhed, ſucceeding writers on the ſubject have had little more to do than to give the tables in the moſt convenient form. It is true that, in conſequence of the numerous diſcoveries which were afterwards made in mathematics, particularly in the doctrine of ſeries, great improvements were made in the method of computing logarithms; but theſe, for the moſt part, came too late to be of uſe in the actual conſtruction of the table, although they might be applied with advantage to verify calculations previouſly performed by methods much more laborious.

As it is of importance that ſuch as have occaſion to employ logarithms ſhould know what works are held in eſtimation on account of their extent and accuracy, we ſhall enumerate the following.

1. Sherwin's *Mathematical Tables*, in 8vo. Theſe contain the logarithms of all numbers to 101,000; and the ſines, tangents, ſecants, and verſed ſines, both natural and logarithmic, to every minute of the quadrant. The third edition, printed in 1742, which was reviſed by Gardiner, is eſteemed the moſt correct; but, in the fifth edition, the errors are ſo numerous, that no dependence can be placed upon it when accuracy is required.

2. Gardiner's Tables of Logarithms for all numbers to 101,000, and for the ſines and tangents to every ten ſeconds of the quadrant; alſo for the ſines of the firſt 72 minutes to every ſingle ſecond, &c. This work, which is in 4to, was printed in 1742, and is held in high eſtimation for its accuracy.

3. An edition of the ſame work, with ſome additions, printed in 1770 in Avignon in France. The tables in both editions are to ſeven places of figures.

4. *Tables Portatives de Logarithmes, publiée à Londres, par Gardiner, augmentées et perfectionées dans leur diſpoſition, par M. Callet.*—This work is moſt beautifully printed in a ſmall octavo volume, and contains all the tables in Gardiner's quarto volume; with ſome additions and improvements.

5. Dr Hutton's Mathematical Tables, containing common hyperbolic and logiſtic logarithms, &c.—This work has paſſed through ſeveral editions, under the care of the learned author: it is perhaps the moſt common of any in this country, and is deſervedly held in the higheſt eſtimation, both on account of its accuracy, and the very valuable information it contains reſpecting the hiſtory of logarithms, and other branches of mathematics connected with them.

6. Taylor's Table of Logarithmic Sines and Tangents to every ſecond of the quadrant; to which is prefixed a table of logarithms from 1 to 100,000, &c.—This is a moſt valuable work; but being a very large quarto volume, and alſo very expenſive, it is leſs adapted to general uſe than the preceding, which is an octavo, and may be had at a moderate price.

7. *Tables portatives des logarithmes, contenant les logarithmes des nombres depuis 1 juſqu'à 108000; les logarithmes des ſinus et tangentes, de ſeconde en ſeconde pour les cinq premiers degrees, de dix en dix ſecondes pour tous les degrees du quart de cercle, et ſuivant la*

Nature of Logarithms, &c.

nouvelle diviſion centeſimale du dix-milliéme en dix milliéme, &c. *par Callet.*—This work, which is in octavo, may be reaſonably expected to be very accurate, it being printed in the ſtereotype manner, by *Didot.*

In addition to theſe, it is proper that we ſhould notice a ſtupendous work relating to logarithms, originally ſuggeſted by the celebrated *Carnot*, in conjunction with *Prieur de la Côte d'Or*, and *Brunet de Montpelier*, about the beginning of the French revolution. This enterpriſe was committed, in the year 1794, to the care of *Prony*, a French mathematician of great eminence, who was *not only to compoſe tables which ſhould leave nothing to be deſired with reſpect to accuracy, but to make them the moſt extended and moſt ſtriking monument of calculation which had ever been executed or ever imagined* *. It appears that two manuſcript copies of the work were formed, compoſed of 17 volumes large folio; and containing, beſides an introduction, the following tables.

1. The natural ſines for each 10,000th part of the quadrant, calculated to twenty-five places of decimals, to be publiſhed with twenty-two decimals and five columns of differences.

2. The logarithms of theſe ſines, calculated to fourteen decimals, with five columns of differences.

3. The logarithms of the ratios of the ſines to the arcs for the firſt five thouſand 100,000th parts of the quadrant, calculated to fourteen decimal places, with three columns of differences.

4. The logarithms of the tangents correſponding with the logarithms of the ſines.

5. The logarithms of the ratios of the tangents to the arcs calculated like thoſe of the third article.

6. Logarithms of numbers from 1 to 100,000, calculated to nineteen places of decimals.

7. The logarithms of numbers from 100,000 to 200,000, calculated to 24 decimals, in order to be publiſhed to 12 decimals and three columns of differences.

The printing of this work was begun at the expence of the French government, but was ſuſpended at the fall of the aſſignats; whether it has been ſince reſumed we cannot poſitively ſay, but it certainly is not yet completed.

SECT. I.

OF THE NATURE OF LOGARITHMS AND THEIR CONSTRUCTION.

WE have already ſhewn that the properties of logarithms are deducible from thoſe of two ſeries, the terms of one of which form a geometrical progreſſion, and thoſe of the other an arithmetical progreſſion; and as this manner of treating the ſubject is ſimple, it is perhaps the beſt adapted of any to ſuch of our readers as have not purſued the ſtudy of mathematics to any great extent. We ſhall now ſhew how, from the ſame principles, the logarithm of any propoſed number whatever may be found.

The firſt ſtep to be taken in conſtructing a ſyſtem of logarithms is to aſſume the logarithm of ſome determinate number, beſides that of unity or 1, which muſt neceſſarily be 0. From the particular view which *Napier* took of the ſubject, he was led to aſſume unity for the logarithm of the number 2.718282, by which it happened that the logarithm of 10 was 2.302585, and this aſſumption being made, the form of the ſyſtem became determinate, and the logarithm of every number fixed to one particular value.

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Mr Briggs however obſerved, that it would be better to aſſume unity for the logarithm of 10, inſtead of making it the logarithm of 2.718282, as in Napier's ſyſtem, and hence the logarithms of the terms of the geometrical progreſſion

1, 10, 100, 1000, 10000, &c.

were neceſſarily fixed to the correſponding terms of this arithmetical progreſſion,

0, 1, 2, 3, 4, &c.

That is, the logarithm of 1 being 0, and that of 10 being 1, the logarithm of 100 is 2, and that of 1000 is 3, and ſo on.

The logarithms of the terms of the progreſſion, 1, 10, 100, 1000, &c. being thus determined; in order to form the logarithms of the numbers between 1 and 10, and between 10, and 100, and ſo on, we muſt conceive a very great number of geometrical means to be interpoſed between each two adjoining terms of the preceding geometrical ſeries, and as many arithmetical means between the correſponding terms of the arithmetical ſeries; then, like as the terms of the arithmetical ſeries 0, 1, 2, 3, &c. are the logarithms of the correſponding terms of the geometrical ſeries 1, 10, 100, 1000, &c. the interpolated terms of the former will alſo be the logarithms of the correſponding interpolated terms of the latter. Now as by ſuppoſing the number of means interpoſed between each two terms of the geometrical ſeries to be ſufficiently great, ſome one or other of them may be found which will be very nearly equal to any propoſed number; it is evident that to find the logarithm of ſuch a number, we have only to ſeek for one of the interpolated means which is very nearly equal to it, and to take the logarithm of that mean as a near value of the logarithm required.

As a particular example, let it be required to find the logarithm of the number 5, according to Briggs's ſyſtem.

Firſt ſtep of the proceſs.—The number 5 is between 1 and 10, the logarithms of which we already know to be 0 and 1: Let a geometrical mean be found between the two former, and an arithmetical mean between the two latter. The geometrical mean will be the ſquare root of the product of the numbers 1 and 10, which is 3.162277; and the arithmetical mean will be half the ſum of the logarithms 0 and 1, which is 0.5; therefore the logarithm of 3.162277 is 0.5. But as the mean thus found is not ſufficiently near to the propoſed number, we muſt proceed with the operation as follows:

Second ſtep.—The number 5, whoſe logarithm is ſought is between 3.162277, the mean laſt found, and 10, the logarithms of which we know to be 0.5 and 1; we muſt now find a geometrical mean between the two former, and an arithmetical mean between the two latter. The one of theſe is $\sqrt{(3.162277 \times 10)} = 5.623413$, and the other is $\frac{1+0.5}{2} = 0.75$; therefore the logarithm of 5.623413 is 0.75.

Third ſtep.—We have now obtained two numbers, namely

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* Nicholſ. Journ. Vol. v. 4to ſeries, p. 311.

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namely 3.162277 and 5.623413, one on each ſide of 5, together with their logarithms 0.5 and .075, we therefore proceed exactly as before, and accordingly we find the geometrical mean, or $\surd(3.162277 \times 5.623413)$, to be 4.216964, and the arithmetical mean, or $\frac{0.5+0.75}{2}$ to be 0.625; therefore the logarithm of 4.216964 is 0.625.

Fourth ſtep.—We proceed in the ſame manner with the numbers 4.216964, and 5.623413 (one of which is leſs, and the other greater than 5) and their logarithms 0.625 and 0.75, and find a new geometrical mean, viz. 4.869674, and its correſponding arithmetical mean, or logarithm, 0.6875.

We muſt go on in this way till we have found twenty-two geometrical means, and as many correſponding arithmetical means or logarithms. And that we may indicate how theſe are found from each other, let the numbers 1 and 10 be denoted by A and B, and their geometrical means taken in their order by C, D, E, &c. then the reſults of the ſucceſſive operations will be as in the following table.

	Numbers.	Logarithms.
A =	1.000000	0.0000000
B =	10.000000	1.0000000
C = √AB =	3.162277	0.5000000
D = √BC =	5.623413	0.7500000
E = √CD =	4.216964	0.6250000
F = √DE =	4.869674	0.6875000
G = √DF =	5.232991	0.7187500
H = √FG =	5.048065	0.7031250
I = √FH =	4.958069	0.6953125
K = √HI =	5.002865	0.6992187
L = √IK =	4.980416	0.6972656
M = √KL =	4.991627	0.6982421
N = √KM =	4.997242	0.6987304
O = √KN =	5.000052	0.6989745
P = √NO =	4.998647	0.6988525
Q = √OP =	4.999350	0.6989135
R = √OQ =	4.999701	0.6989440
S = √OR =	4.999876	0.6989592
T = √OS =	4.999963	0.6989668
V = √OT =	5.000008	0.6989707
W = √TV =	4.999984	0.6989687
X = √WV =	4.999997	0.6989697
Y = √VX =	5.000003	0.6989702
Z = √XY =	5.000000	0.6989700

As the laſt of theſe means, viz. Z, agrees with 5, the propoſed number, as far at leaſt as the ſixth place of decimals, we may ſafely conſider them as very nearly equal, therefore their logarithms will alſo be very nearly equal, that is the logarithm of 5 will be 0.6989700 nearly.

In performing the operations indicated in the preceding table it will be neceſſary to find the geometrical means at the beginning to many more figures than are here put down, in order to obtain at laſt a reſult true to 7 decimal places. Thus it appears that the labour of computing logarithms by this method is indeed very great. It is, however, that which was employed by Briggs and Vlacq in the original conſtruction of logarithms; but ſince the period in which they lived, others more eaſy have been found, as we ſhall preſently have occaſion to explain.

The logarithm of any number whatever may be found by a ſeries of calculations ſimilar to that which we have juſt now explained. But in conſtructing the table it would only be neceſſary to have recourſe to this method in calculating the logarithms of prime numbers; for as often as the logarithm of a number which was the product of other numbers, whoſe logarithms were known, was required, it would be immediately obtained by adding together the logarithms of its factors. On the contrary, if the logarithm of the product of two numbers were known, and alſo that of one of its factors, the logarithm of the other factor would be obtained from theſe, by ſimply taking their difference.

From this laſt remark it is obvious, that having now found the logarithm of 5, we can immediately find that of 2; for ſince 2 is the quotient of 10 divided by 5, its logarithm will be the difference of the logarithms of 10 and 5; now the logarithm of 10 is 1, and the logarithm of 5 is 0.6989700, therefore the logarithm of 2 is 0.3010300.

Having thus obtained the logarithms of 2 and 5, in addition to thoſe of 10, 100, 1000, &c. we may thence find the logarithms of innumerable other numbers. Thus, becauſe 4=2×2, the logarithm of 4 will be the logarithm of 2 added to itſelf, or will be twice the logarithm of 2. Again, becauſe 5×10=50, the logarithm of 50 will be the ſum of the logarithms of 5 and 10. In this manner it is evident we may find the logarithms of 8=2×4, of 16=2×8, of 25=5×5, and of as many more ſuch numbers as we pleaſe.

Beſides the view we have hitherto taken of the theory of logarithms, there are others under which it has been preſented by different authors. Some of theſe we proceed to explain, beginning with that in which they are defined to be the *meaſures of ratios*; but to ſee the propriety of this definition, it muſt be underſtood what is meant by the meaſure of a ratio.

According to the definition of a compound ratio, as laid down by writers on geometry, if there be any number of magnitudes A, B, C, D, which are continual proportionals, or ſuch that the ratio of A to B is equal to the ratio of B to C, and that again is equal to the ratio of C to D, and ſo on, the ratio of the firſt of theſe magnitudes A to the third C is conſidered as made up of two equal ratios, each equal to the ratio of the firſt A to the ſecond B. And in like manner the ratio of the firſt A to the fourth D is conſidered as made up of three equal ratios, each equal to the ratio of the firſt to the ſecond, and ſo on. (See GEOMETRY Sect. III. Def. 10, 11, and 12.) Thus, to take a particular example in numbers, becauſe the ratio of 81 to 3 may be conſidered as made up of the ratio of 81 to 27, and of 27 to 9, and of 9 to 3, which three ratios are equal among themſelves, (GEOMETRY Sect. III. Def. 4.) the ratio of 81 to 3 will be triple the ratio of 9 to 3; and in like manner the ratio of 27 to 3 will be double the ratio of 9 to 3. Alſo, becauſe the ratios of 1000 to 100, 100 to 10, 10 to 1, are all equal, the ratio of 1000 to 1 will be three times as great as the ratio of 10 to 1; and the ratio of 100 to 1 will be twice as great; and ſo on.

Taking this view of ratios, and conſidering them as a particular ſpecies of quantities, made up of others of the ſame kind, they may evidently be compared with each other, in reſpect of their magnitudes, in the ſame manner as we compare lines or quantities of any kind whatever.

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whatever. And as when eſtimating the relative magnitudes of two quantities, two lines for example, if we find that the one contains five ſuch equal parts as the other contains ſeven, we ſay the one line has to the other the proportion of 5 to 7; ſo, in like manner, if two ratios be ſuch, that the one can be reſolved into five equal ratios, and the other into ſeven of the ſame ratios, we may conclude that the magnitude of the one ratio is to that of the other as the number 5 to the number 7; and a ſimilar concluſion may be drawn, when the ratios to be compared are any multiples whatever of ſome other ratio.

It is well known that there may be lines and other quantities, which, as they admit of no common meaſure, are ſaid to be incommenſurable to each other; and the ſame will alſo happen to ratios: That is, there may be two ratios ſuch that into whatever number of equal ratios the one is divided, the other cannot poſſibly be exactly equal to a ratio compoſed of any number of theſe. We may however conceive the number of equal ratios into which the one is divided to be ſo great that a certain number of them ſhall compoſe a ratio more nearly equal to the other ratio than by any aſſignable difference. Therefore, like as we can always find numbers which ſhall have among themſelves, either accurately, or as nearly as we pleaſe, the ſame ratios as any number of lines or other magnitudes have to each other, and which therefore may be taken as the meaſures, or repreſentatives of the lines; ſo alſo, correſponding to any ſyſtem of ratios, there may be always found a ſeries of numbers which will have the ſame proportions among themſelves as the ratios have to each other, and which may in like manner be called the *meaſures of the ratios*.

Let us now ſuppoſe that unity, or 1, is aſſumed as the common conſequent of all ratios whatever; and that the ratio of 10 (or ſome particular number) to 1 is compounded of a very great number of equal ratios, as for example 1000,000: then, as each of theſe will be very near to the ratio of equality, (for it will be the ratio of the firſt term to the ſecond of a ſeries of one million and one continued proportionals, the firſt of which is 10 and laſt 1), it will follow, and is eaſy to conceive, that the ratios of all other numbers to unity will each be very nearly equal to ſome multiple of that ſmall ratio. And by ſuppoſing the number of ſmall equal ratios of which the ratio of 10 to 1 is compoſed to be ſufficiently great, the ratios of all other numbers to unity may be as nearly equal to ratios which are multiples of that ſmall ratio as we pleaſe. Let us ſtill ſuppoſe, however, for the ſake of illuſtration, that the number of ſmall ratios contained in that of 10 to 1 is 1000,000 then, as it may be proved that the ratio of 2 to 1 will be very nearly the ſame as a ratio compoſed of 301030 of theſe; and that the ratio of 3 to 1 will be nearly equal to a ratio compoſed of 477121 of them, and that the ratio of 4 to 1 will be nearly equal to a ratio compoſed of 602060 of them, and ſo on; theſe numbers, viz. 1000000, 301030, 477121, and 602060, or any other numbers proportional to them, will be the *meaſures* of the ratios of 10 to 1, 2 to 1, 3 to 1, and 4 to 1, reſpectively; and the ſame quantities will alſo be what have been called the *logarithms* of the ratios; for the word *logarithm*, if regard be had to its etymology, is *λογων αριθμος*, or the numbers of ſmall and equal ratios (or *ratiuncula* as they have been called) contained in the ſeveral ratios of quantities one to another.

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We have for the ſake of illuſtration, aſſumed 1000000 as the meaſure of the ratio of 10 to 1, by which it happens, as already obſerved, that the meaſures of the ratios of 2 to 1, 3 to 1, &c. are 301030 and 477121 reſpectively; as, however, theſe meaſures are not abſolute, but relative quantities, we may aſſume any other numbers whatever inſtead of theſe, provided they have the ſame proportions to each other as theſe numbers have among themſelves. Accordingly, we may aſſume 1 as the meaſure or logarithm of the ratio of 10 to 1; and then the logarithms of the ratios of 2 to 1, 3 to 1, &c. inſtead of being 301030, 477121, &c. will be .301030 and .477121, &c. reſpectively, that is, each will be the one-millionth of what it was before.

In *Briggs's* ſyſtem, the logarithm of the ratio of 10 to 1, or, to ſpeak briefly, the logarithm of 10, is unity; but we are at liberty to aſſume any number whatever, as that whoſe logarithm ſhall be unity. Napier, in conſequence of his particular views of the ſubject, choſe the number 2.718282; and hence it happens that the logarithms of the ratios are expreſſed by different numbers in the two ſyſtems.

It yet remains for us to ſhew the identity of the properties of logarithms, as explained in the two different views we have now given of the ſubject; and this may be done as follows.

Let A and B denote any two numbers. The ratio of their product to unity, that is, the ratio of $A\times B$ to 1, is compounded of the ratio of $A\times B$ to B, and of B to 1; (ſee GEOMETRY Part III. Def. 10.) but ſince $A\times B$, B, A, and 1 are four proportionals, the ratio of $A\times B$ to B is equal to the ratio of A to 1. Therefore the ratio of $A\times B$ to 1 is compounded of the ratio of A to 1 and of B to 1; and conſequently the logarithm of the ratio of $A\times B$ to 1 will be equal to the ſum of the logarithms of the ratios of A to 1, and of B to 1; or in other words, the logarithm of $A\times B$ will be the ſum of the logarithms of A and B.

And becauſe $\log.(A\times B)=\log. A+\log. B$, therefore, $\log. B=\log.(A\times B)-\log. A$. In this equation let $\frac{C}{D}$ be ſubſtituted for B, and D for A, then, (becauſe $A\times B=D\times\frac{C}{D}=C$) we have $\log.\frac{C}{D}=\log. C-\log. D$.

We have now given a ſhort ſketch of the theory of logarithms as deducible from the doctrine of ratios. It was in this way that the celebrated Kepler treated the ſubject according to the ſtricteſt rules of geometrical reaſoning; and in this he has been followed by Mercator, Halley, Cotes, as well as by other mathematicians of later times, as by Mr Baron Maſeres, in his "Elements of Plane Trigonometry," a work in which the whole theory of logarithms is treated with all that perſpicuity and accuracy which characterize the ingenious author's various writings. The ſame mode of treating the ſubject was likewiſe adopted by that excellent geometrician Dr Robert Simſon, as appears by a ſhort tract in Latin, written by him and publiſhed in his poſthumous works. As, however, the doctrine of ratios is of a very abſtract nature, and the mode of reaſoning upon which it has been eſtabliſhed is of a peculiar and ſubtle kind, we preſume that the greater number of readers will think this view of the ſubject leſs ſimple and natural than the following, in which we mean to deduce the theory of logarithms, as well as the manner of computing them, from the properties of the exponents of powers.

If we attend to the common ſcale of notation in arithmetic, we ſhall find that it is ſo contrived as to expreſs all numbers whatever by means of the powers of the number 10, which is the root of the ſcale, and the nine digits which ſerve as coefficients to theſe powers. Thus, if R denote 10, the root of the ſcale, ſo that R^2 will denote 100, and R^3 1000, and ſo on, the number 471509 is otherwiſe expreſſed by $4R^5+7R^4+1R^3+5R^2+0R^1+9R^0$, which is equivalent to $4R^5+7R^4+R^3+5R^2+9$. Again, the mixt number 371.243 is expreſſed by $3R^2+7R^1+R^0+\frac{2}{R}+\frac{4}{R^2}+\frac{3}{R^3}$, or by $3R^2+7R^1+R^0+2R^{-1}+4R^{-2}+3R^{-3}$. As to vulgar fractions, by transforming them to decimals, they may be expreſſed in the ſame manner. Thus $\frac{3}{8}=.375=3R^{-1}+7R^{-2}+5R^{-3}$. Alſo $\frac{2}{3}=.666$, &c.$=6R^{-1}+6R^{-2}+6R^{-3}+$ &c.

Although the number 10 has been fixed upon as the root of the ſcale of notation, any other number may be employed to expreſs all numbers whatever in the ſame manner; and ſome numbers are even preferable to 10. Thus, making 8 the root of a ſcale, and denoting it by R, the number 2735, when expreſſed according to this ſcale, is $5R^3+2R^2+5R^1+7R^0$, or $5R^3+2R^2+5R+7$; and here we may obſerve, that if a number greater than 10 were aſſumed as the root of the ſcale of notation, it would be neceſſary to adopt ſome new numeral characters in addition to thoſe in common uſe, and if a ſmaller number were aſſumed, we might diſpenſe with ſome of thoſe we already have.

But inſtead of expreſſing all numbers by the ſums of certain multiples of the ſucceſſive powers of ſome particular number, we may alſo expreſs them, if not accurately, at leaſt as near as we pleaſe, by a ſingle power, whole or fractional, of any poſitive number whatever, which may be either whole or fractional, but muſt not be unity.

Let us take, for example, 2 as the number, by the powers of which all others are to be expreſſed. Then it may be ſhewn that the numbers 1, 2, 3, &c. are all expreſſible by the powers of 2, as follows.

$1=2^0$ $\qquad 6=2^{2.58496}$ nearly
$2=2^1$ $\qquad 7=2^{2.8073}$ nearly
$3=2^{1.58496}$, nearly $\qquad 8=2^3$
$4=2^2$ $\qquad 9=2^{3.1699}$
$5=2^{2.3219}$, nearly $\qquad 10=2^{3.3219}$ nearly,

and ſo on. And if inſtead of 2 we take the number 10, then we have

$1=10^0$ $\qquad 6=10^{.77815}$
$2=10^{.30103}$ $\qquad 7=10^{.84510}$
$3=10^{.47712}$ $\qquad 8=10^{.90309}$
$4=10^{.60206}$ $\qquad 9=10^{.95424}$
$5=10^{.69897}$ $\qquad 10=10^1$.

Hence we may conclude, that if r be put for ſome determinate number, and n for any indefinite poſitive number, whole or fractional, it is always poſſible to find another number N, ſuch, that the number r being raiſed to the power N ſhall either be exactly equal to n, or ſhall be as near to it as we pleaſe; that is, we ſhall have $r^N=n$.

When numbers are expreſſed in this way by the powers of ſome given number r; *the exponent of that power of r which is equal to any aſſigned number is called the logarithm of that number*. Therefore, if $rN=n$, (n being put for any number) then N will be the logarithm of the number n.

The logarithms which are produced by giving to r ſome determinate value conſtitute a *ſyſtem* of logarithms, and the conſtant number r, from which the ſyſtem is formed, is called the *baſe* or *radical* number of the ſyſtem.

The properties of logarithms may be readily deduced from the above definition as follows. Let a and b be put for any two numbers, and A and B for their logarithms; then, r being ſuppoſed to denote the baſe, or radical number of the ſyſtem, we have $a=r^A$ and $b=r^B$: now if we take the product of a and b, we have $ab=r^A\times r^B=r^{A+B}$; but according to the definition, A+B is the logarithm of $a\,b$, (for it is the index of that power of r which is equal to $a\,b$) therefore, *the ſum of the logarithms of any two numbers a and b is the logarithm of their product a b*. Again, we have $\frac{a}{b}=\frac{r^A}{r^B}=r^{A-B}$, but here A—B is the index of that power of r which is equal to $\frac{a}{b}$; therefore, A—B is the logarithm of $\frac{a}{b}$; hence, *if one number a be divided by another number b, the exceſs of the logarithm of the dividend above that of the diviſor is equal to the logarithm of the quotient* $\frac{a}{b}$.

Let n expreſs any number whatever, then, raiſing both ſides of the equation $a=r^A$ to the nth power, we have $a^n=\left(r^A\right)^n=r^{nA}$; but here nA is manifeſtly the logarithm of a^n; therefore, *the logarithm of a^n, any power of a number, is the product of the logarithm of the number by n, the index of the power. And this muſt evidently be true, whether that index be a whole number, or a fraction, either poſitive or negative.*

From theſe properties it is eaſy to ſee in what manner a table that exhibits the logarithms of all numbers within certain limits may be applied to ſimplify calculations: for ſince the ſum of the logarithms of any two numbers is equal to the logarithm of their product; it follows, that as often as we have occaſion to find the product of two or more numbers, we have only to add their logarithms into one ſum, taking them from the table, and to look in the table for the number whoſe logarithm is equal to that ſum, and this number will be the product required. Alſo, becauſe the exceſs of the logarithm of the dividend above that of the diviſor is equal to the logarithm of the quotient; as often as we have occaſion to divide one number by another, we have

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only to ſubtract the logarithm of the diviſor from that of the dividend, and oppoſite to that logarithm in the table, which is the remainder, we ſhall find the quotient.

As the logarithm of any power of a number is the product of the logarithm of the number, and the index of the power; and on the contrary, the logarithm of any root of a number is the quotient found by dividing the logarithm of the number by the index of the root; it follows, that we may find any power or root of a number, by multiplying the logarithm of the number by the index of the power, or dividing it by the index of the root, and taking that number in the table whoſe logarithm is the product or quotient for the power or root required.

If in the equation $a=r^{A}$ (where a is any number, A its logarithm, and r the baſe of the ſyſtem) we ſuppoſe $a=1$, then, in this caſe $r^{A}=1$; but this equation can only be ſatisfied by putting $A=0$. Hence it appears, *that in every ſyſtem of logarithms, the logarithm of unity muſt be* 0. If on the other hand we aſſume $a=r$; then we have the equation $r=r^{A}$, which is immediately ſatisfied by putting $A=1$; therefore, *the logarithm of the baſe, or radical number of every ſyſtem is neceſſarily unity.*

If we ſuppoſe r to be a poſitive number greater than unity, and a a poſitive number greater than unity, then A will be a poſitive number; for if it be negative we would have $a\left(=r^{-A}=\frac{1}{r^{A}}\right)$ a proper fraction, and at the ſame time a number greater than unity by hypotheſis, which is impoſſible. If on the contrary we ſuppoſe a a proper fraction, then A muſt neceſſarily be negative, for if it were poſitive, then r^{A} would be greater than unity, and $a(=r^{A})$ alſo greater than unity, while by hypotheſis it is a fraction leſs than unity, which is impoſſible. *Therefore, in every ſyſtem, the baſe of which is greater than unity, the logarithm of a whole or mixt number is always poſitive. but the logarithm of a proper fraction is always negative.*

Becauſe the logarithm of r is unity, the logarithm of r^{n} will be n; therefore, *the logarithm of any integer power of the radical number r will always be an integer.*

Let r and r' denote baſes of two different ſyſtems; and let A be the logarithm of a number, a, taken according to the firſt of theſe, and A' its logarithm taken according to the laſt. Then becauſe $a=r^{A}$, and $a=r'^{A'}$, it follows that $r^{A}=r'^{A'}$, and $r=r'^{\frac{A'}{A}}$. Let us now ſuppoſe that r'' is the baſe of a third ſyſtem of logarithms, and R and R′ the logarithms of r and r' taken according to this third ſyſtem; then becauſe

$$r''^{R}=r, \qquad r''^{R'}=r';$$

$$\text{we have } r''^{RR'}=r^{R'},\ r''^{RR'}=r'^{R};$$

therefore $r^{R'}=r'^{R}$, and $r=r'^{\frac{R}{R'}}$; but we have already found $r=r'^{\frac{A'}{A}}$, therefore $r'^{\frac{A'}{A}}=r'^{\frac{R}{R'}}$, and conſequently

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$\frac{A'}{A}=\frac{R}{R'}$, and $A:A'(::R':R)::\frac{1}{R}:\frac{1}{R'}$. Hence it appears, *that the logarithm of a number, taken according to one ſystem, has to its logarithm, taken according to any other ſystem, a conſtant ratio, which is the ſame as that of the reciprocals of the logarithms of the radical numbers of thoſe ſystems, taken according to any ſystem whatever.*

Let us next ſuppoſe, that a and b are two numbers, and A and B their logarithms, taken according to the ſame ſyſtem, and r the baſe of the ſyſtem; then becauſe

$$r^{A}=a, \qquad r^{B}=b;$$

$$\text{we have } r^{AB}=a^{B},\ r^{AB}=b^{A};$$

therefore $a^{B}=b^{A}$, and $a=b^{\frac{A}{B}}$, now as r is not found in this equation, the value of the fraction $\frac{A}{B}$ depends only on the numbers a and b; therefore, *the logarithms of any two given numbers have the ſame ratio in every ſyſtem whatever.*

Having now explained the properties which belong to the logarithms of any ſyſtem whatever, we proceed to inveſtigate general rules by which the number correſponding to any logarithm, and on the contrary, the logarithm correſponding to any number, may be found the one from the other. And for this end let us denote any number whatever by y, and its logarithm by x, and put r as before for the baſe, or radical number of the ſyſtem; then by the nature of logarithms we have this equation

$$y=r^{x}.$$

Put $r=1+a$, and let the expreſſion $(1+a)^{x}$ be expanded into a ſeries by the binomial theorem; thus we ſhall have $y=$

$$1+xa+\frac{x(x-1)}{1\,.\,2}a^{2}+\frac{x(x-1)(x-2)}{1\,.\,2\,.\,3}a^{3}$$
$$+\frac{x(x-1)(x-2)(x-3)}{1\,.\,2\,.\,3\,.\,4}a^{4}+\ \&c.$$

Let this ſeries, the terms of which are arranged according to the powers of the quantity a, be transformed into another the terms of which ſhall be arranged according to the powers of x; and to effect this we muſt find the actual products of the factors which conſtitute the powers of a, and arrange the terms anew, as follows,

$$1=1,$$
$$xa=+ax,$$
$$\frac{x(x-1)}{1\,.\,2}a^{2}=-\frac{a^{2}}{2}x+\frac{a^{2}}{2}x^{2},$$
$$\frac{x(x-1)(x-2)}{1\,.\,2\,.\,3}a^{3}=+\frac{a^{3}}{3}x-\frac{a^{3}}{2}x^{2}+\frac{a^{3}}{6}x^{3},$$
$$\frac{x(x-1)(x-2\ (x-3)}{1\,.\,2\,.\,3\,.\,4}=-\frac{a^{4}}{4}x+\frac{11a^{4}}{24}x^{2}-\frac{a^{4}}{4}x^{3}+\frac{a^{4}}{24}x^{4},$$
$$\&c. \qquad\qquad \&c.$$

ſo that adding into one ſum the quantities on each ſide of the ſign $=$, and recollecting that the ſum of theſe on the left-hand ſide is equal to y, we have

$$y=r^x=\begin{cases}1\\+\left(a-\frac{a^2}{2}+\frac{a^3}{3}-\frac{a^4}{4}+\text{\&c.}\right)x,\\+\left(\frac{a^2}{2}-\frac{a^3}{2}+\frac{11a^4}{24}-\text{\&c.}\right)x^2,\\+\left(\frac{a^3}{6}-\frac{a^4}{4}+\text{\&c.}\right)x^3,\\+\left(\frac{a^4}{24}-\text{\&c.}\right)x^4,\\+\text{\&c.}\end{cases}$$

which equation, by ſubſtituting,

$$\text{A for } a-\frac{a^2}{2}+\frac{a^3}{3}-\frac{a^4}{4}+\text{\&c.}$$

$$\text{A}' \text{ for } \frac{a^2}{2}-\frac{a^3}{2}+\frac{11a^4}{4}-\text{\&c.}$$

$$\text{A}'' \text{ for } \frac{a^3}{6}-\frac{a^4}{4}+\text{\&c.}$$

$$\text{A}''' \text{ for } \frac{a^4}{24}-\text{\&c.}$$

&c.

may be abbreviated to

$$r^x=1+\text{A}x+\text{A}'x^2+\text{A}''x^3+\text{A}'''x^4+\text{\&c.}$$

Next, to determine the law of connexion of the quantities A, A′, A″, A‴, &c. let $x+z$ be ſubſtituted in the laſt equation for x, (here z is put for any indefinite quantity) thus it becomes

$$r^{x+z}=1+\text{A}(x+z)+\text{A}'(x+z)^2+\text{A}''(x+z)^3+\text{\&c.}$$

But $r^{x+z}=r^x\times r^z$, and ſince it has been ſhewn that

$$r^x=1+\text{A}x+\text{A}'x^2+\text{A}''x^3+\text{A}'''x^4+\text{\&c.}$$

for the very ſame reaſon

$$r^z=1+\text{A}z+\text{A}'z^2+\text{A}''z^3+\text{A}'''z^4+\text{\&c.}$$

therefore the ſeries

$$1+\text{A}(x+z)+\text{A}'(x+z)^2+\text{A}''(x+z)^3+\text{A}'''(x+z)^4+\text{\&c.}$$

is equal to the product of the two ſeries

$$1+\text{A}x+\text{A}'x^2+\text{A}''x^3+\text{A}'''x^4+\text{\&c.}$$
$$1+\text{A}z+\text{A}'z^2+\text{A}''z^3+\text{A}'''z^4+\text{\&c.}$$

That is, by actual involution and multiplication

$$\left.\begin{array}{l}1+\text{A}x+\text{A}'x^2+\text{A}''x^3+\text{A}'''x^4+\text{\&c.}\\+\text{A}z+2\text{A}'xz+3\text{A}''x^2z+4\text{A}'''x^3z+\text{\&c.}\\+\text{A}'z^2+3\text{A}''xz^3+6\text{A}'''x^2z^2+\text{\&c.}\\+\text{A}''z^3+4\text{A}'''xz^3+\text{\&c.}\\+\text{A}'''z^4+\text{\&c.}\end{array}\right\}=$$

$$=\begin{cases}1+\text{A}x+\text{A}'x^2+\text{A}''x^3+\text{A}'''x^4+\text{\&c.}\\+\text{A}z+\text{A}^2xz+\text{A}\text{A}'x^2z+\text{A}\text{A}''x^3z+\text{\&c.}\\+\text{A}'z^2+\text{A}\text{A}'xz^2+\text{A}'\text{A}'x^2z^2+\text{\&c.}\\+\text{A}''z^3+\text{A}\text{A}''xz^3+\text{\&c.}\\+\text{A}'''z^4+\text{\&c.}\end{cases}$$

Now as the quantities A, A′, A″, &c. are quite independent of x and z, the two ſides of the equation can only be identical upon the ſuppoſition that the coefficients of like terms in each are equal; therefore, ſetting aſide the firſt line of each ſide of the equation, becauſe their terms are the ſame, and alſo the firſt term of the ſecond line, for the ſame reaſon, let the coefficients of the remaining terms be put equal to one another, thus we have

$$\left.\begin{array}{c}\text{A}^2=2\text{A}'\\\text{A}\text{A}'=3\text{A}''\\\text{A}\text{A}''=4\text{A}'''\\\text{\&c.}\end{array}\right\}\text{ and hence we have }\left\{\begin{array}{l}\text{A}'=\frac{\text{A}^2}{1\cdot 2}\\\text{A}''=\frac{\text{A}^3}{1\cdot 2\cdot 3}\\\text{A}'''=\frac{\text{A}^4}{1\cdot 2\cdot 3\cdot 4}\\\text{\&c.}\end{array}\right.$$

Here the law of the coefficients A, A′, A‴, &c. is obvious, each being formed from the preceding by multiplying it by A, and dividing by the exponent of the power of A which is thus formed. Let theſe values of A′, A″, &c. be now ſubſtituted in the equation

$$y=r^x=1+\text{A}x+\text{A}'x^2+\text{A}''x^3+\text{\&c.}$$

and it becomes,

$$y=1+\text{A}x+\frac{\text{A}^2}{1\cdot 2}x^2+\frac{\text{A}^3}{1\cdot 2\cdot 3}x^3+\frac{\text{A}^4}{1\cdot 2\cdot 3\cdot 4}x^4+\text{\&c.}$$

thus we have obtained a general formula expreſſing a number in terms of its logarithm and the baſe of the ſyſtem, for we muſt recollect that the quantity A which is equal to

$$a-\frac{a^2}{2}+\frac{a^3}{3}-\frac{a^4}{4}+\frac{a^5}{5}-\text{\&c.}$$

is otherwiſe expreſſed by

$$r-1-\frac{(r-1)^2}{2}+\frac{(r-1)^3}{3}-\frac{(r-1)^4}{4}+\frac{(r-1)^5}{5}-\text{\&c.}$$

where r denotes the baſe of the ſyſtem (A).

If in the formula

$$r^x=1+\text{A}x+\frac{\text{A}^2}{1\cdot 2}x^2+\frac{\text{A}^3}{1\cdot 2\cdot 3}x^3+\frac{\text{A}^4}{1\cdot 2\cdot 3\cdot 4}x^4+\text{\&c}$$

we ſuppoſe $x=1$, it becomes

$$r=1+\text{A}+\frac{\text{A}^2}{1\cdot 2}+\frac{\text{A}^3}{1\cdot 2\cdot 3}+\frac{\text{A}^4}{1\cdot 2\cdot 3\cdot 4}+\text{\&c.}$$

an equation which contains r only; but as r has been all along ſuppoſed an indeterminate quantity, this equation muſt be identical, that is, if inſtead of A, its value, as expreſſed above in terms of r, were ſubſtituted, the whole would vaniſh.

Again, let us ſuppoſe that $\frac{1}{\text{A}}$ is ſubſtituted inſtead of x in the general formula, thus it becomes

$$r^{\frac{1}{\text{A}}}=1+1+\frac{1}{1\cdot 2}+\frac{1}{1\cdot 2\cdot 3}+\frac{1}{1\cdot 2\cdot 3\cdot 4}+\text{\&c.}$$

(A) For other analytic methods of inveſtigating the ſame formula, ſee Algebra § 293, and Fluxions § 54. and § 70. Ex. 1. alſo § 200. Prob. 1.

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Thus the quantity $r^{\frac{1}{A}}$, whatever be the value of r, is evidently equal to a conſtant number, which, as appears from the laſt equation, is equal to the value of r when $A=1$. By adding together a ſufficient number of the terms of the ſeries expreſſing the value of $r^{\frac{1}{A}}$, we find that quantity equal to

$$2.718281828459045\ldots$$

Let this number be denoted by e, and we have $r^{\frac{1}{A}}=e$, and $r=e^{A}$; hence it appears, that if the number e be conſidered as the baſe of a logarithmic ſyſtem, the quantity A, that is

$$r-1-\frac{(r-1)^2}{2}+\frac{(r-1)^3}{3}-\frac{(r-1)^4}{4}+\frac{(r-1)^5}{5}-\text{\&c.}$$

is the logarithm of r to the baſe e. But as r is not reſtricted here to any particular value, we may ſubſtitute y inſtead of it, keeping in mind that y denotes any number whatever, and x its logarithm; thus we have x the logarithm of y, expreſſed by the ſeries

$$y-1-\frac{(y-1)^2}{2}+\frac{(y-1)^3}{3}-\frac{(y-1)^4}{4}+\frac{(y-1)^5}{5}-\text{\&c.}$$

ſuppoſing that the baſe of the ſyſtem is the number we have expreſſed above by e.

We have now found a general formula for the logarithm of any number, y, taken according to a particular ſyſtem, namely, that which has the number e for its baſe. But it is eaſy from hence to find a formula, which ſhall apply to any ſyſtem whatever. For it has been ſhewn that the logarithms of the ſame number, taken according to two different ſyſtems, are to each other as the reciprocals of the logarithms of the baſes of the ſyſtems, theſe laſt logarithms being taken according to any ſyſtem whatever, that is,

$$\log.\ y \text{ to baſe } e : \log.\ y \text{ to baſe } r :: \frac{1}{\log.\ e} : \frac{1}{\log.\ r};$$

hence we find

$$\log.\ y \text{ to baſe } r=\frac{\log.\ e}{\log.\ r}\times\log.\ y \text{ to baſe } e.$$

Let the value we have already found for the logarithm of y to baſe e be ſubſtituted in this equation, and it becomes

$$\log.\ y=x=\frac{\log.\ e}{\log.\ r}\left\{y-1-\frac{(y-1)^2}{2}+\frac{(y-1)^3}{3}-\frac{(y-1)^4}{4}+\text{\&c.}\right\}$$

which is a general formula for the logarithm of *any number whatever*, to the baſe r. And it is to be recollected that in the fraction $\frac{\log.\ e}{\log.\ r}$, which is a common multiplier to the ſeries, the logarithms are to be taken according to the ſame baſe, which however may be any number whatever (B).

If in the above formula we ſuppoſe $r=e$, the multiplier $\frac{\log.\ e}{\log.\ r}$ will be unity, and the formula will become ſimply

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$$\log.\ y=y-1-\frac{(y-1)^2}{2}+\frac{(y-1)^3}{3}-\frac{(y-1)^4}{4}+\text{\&c.}$$

as we have already remarked. Now this is the ſyſtem which was adopted by *Lord Napier*; and although the logarithms which were computed according to this ſyſtem, or upon the ſuppoſition that the radical number is 2.7182818 &c. have been called *hyperbolic logarithms* becauſe they happen to be proportional to certain hyperbolic ſpaces, yet, as the logarithms of every ſyſtem have the ſame property, it is more proper to call them *Napierean logarithms*.

As the conſtant multiplier $\frac{\log.\ e}{\log.\ r}$, which occurs in the general formula for the logarithm of any number, is the only part of the formula which depends for its value upon the baſe of the ſyſtem, it has been called by writers on logarithms, the *modulus* of the ſyſtem. If we ſuppoſe the logarithms taken to the baſe e, then the numerator, viz. log. e, will be unity, and the denominator will be the Napierean logarithm of r. If however we ſuppoſe the logarithms taken to the baſe r, then the numerator will be log. e to baſe r; and the denominator will be unity, ſo that the *modulus* of any ſyſtem whoſe baſe is r, is *the reciprocal of the Napierean logarithm of that baſe*; or it is *the logarithm of the number* e (the baſe of the Napierean ſyſtem) *to the baſe* r.

In the Napierian ſyſtem the *modulus* is unity, and hence the logarithms of this ſyſtem, as far as depends upon facility of computation, are the moſt ſimple of any. It was however ſoon found that a ſyſtem whoſe baſe ſhould be the ſame as the root of the ſcale of the arithmetical notation, viz. the number 10, would be the moſt convenient of any in practice; and accordingly ſuch a ſyſtem was actually conſtructed by Mr *Briggs*. This is the only one now in common uſe, and is called *Briggs's ſyſtem*, alſo *the common ſyſtem* of logarithms. The *modulus* of this ſyſtem therefore is the reciprocal of the Napierean logarithm of 10; or it is the common logarithm of $e=2.7182818$ &c. the baſe of the Naperean ſyſtem. We ſhall in future denote this *modulus* by M; ſo that the formula expreſſing the common logarithm of any number y will be

$$\log.\ y=M\left\{1-y-\frac{(1-y)^2}{2}+\frac{(1-y)^3}{3}-\frac{(1-y)^4}{4}+\text{\&c.}\right\}$$

If the number y, whoſe logarithm is required be very near to unity, ſo that $1-y$ is a ſmall quantity, then the logarithm may be found from this formula with great eaſe, becauſe the ſeries will converge very rapidly. If, however, $1-y$ be greater than unity, the ſeries, inſtead of converging, will diverge, ſo as to be in its preſent form of no uſe.

It may however be transformed into another, which ſhall converge in every caſe, by ſubſtituting in it $\sqrt[n]{y}$ inſtead of y, and obſerving that $\log.\ (\sqrt[n]{y})=\frac{\log.\ y}{n}$; it

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(B) For other methods of inveſtigating the ſame formula ſee ALGEBRA 284, and FLUXIONS § 70. Ex. 2. alſo § 136.

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it thus becomes

$$\log. y = nM\left\{\sqrt[n]{y}-1-\tfrac{1}{2}(\sqrt[n]{y}-1)^2+\tfrac{1}{3}(\sqrt[n]{y}-1)^3-\&c.\right\}$$

where *n* may denote any number whatever, poſitive or negative. But whatever be the number *y*, we can always take *n*, ſuch, that $\sqrt[n]{y}$ ſhall be as nearly equal to 1, as we pleaſe, therefore by this laſt formula, we can always find the logarithm of *y* to any degree of accuracy whatever.

If we ſuppoſe *n* to be taken negative, then $\sqrt[n]{y} = \frac{1}{\sqrt[n]{y}}$, and the ſeries which expreſſes log. *y* becomes, by changing the ſigns,

$$\log. y = nM\left\{1-\frac{1}{\sqrt[n]{y}}+\tfrac{1}{2}\left(1-\frac{1}{\sqrt[n]{y}}\right)^2+\tfrac{1}{3}\left(1-\frac{1}{\sqrt[n]{y}}\right)^3+\&c.\right\}$$

where all the terms are poſitive. Thus we have it in our power to expreſs the value of *y*, either by a ſeries which ſhall have its terms all poſitive, or by one which ſhall have its terms alternately poſitive and negative: for it is evident that *y* being greater than unity, $\sqrt[n]{y}$ will alſo be greater than unity, and *y* being leſs than unity, $\sqrt[n]{y}$ will alſo be leſs than unity, but the differences will be ſo much the ſmaller as *n* the exponent of the root is greater; therefore $\sqrt[n]{y}-1$ will be poſitive in the firſt caſe, and negative in the ſecond.

Becauſe $M = \frac{1}{\text{Nap. log. } 10}$, therefore Nap. log. 10 $= \frac{1}{M}$: hence by the two laſt formulas we have

$$\frac{1}{M} = n\left\{\sqrt[n]{10}-1-\tfrac{1}{2}(\sqrt[n]{10}-1)^2+\tfrac{1}{3}(\sqrt[n]{10}-1)^3-\&c.\right\}$$

alſo

$$\frac{1}{M} = n\left\{1-\frac{1}{\sqrt[n]{10}}+\tfrac{1}{2}\left(1-\frac{1}{\sqrt[n]{10}}\right)^2+\tfrac{1}{3}\left(1-\frac{1}{\sqrt[n]{10}}\right)^3+\&c.\right\}$$

It is evident that by giving to $\sqrt[n]{y}$ ſuch a value that $\sqrt[n]{y}-1$ is a fraction leſs than unity, we render both the ſeries for the value of log. *y* converging; for as $\sqrt[n]{y}-1$ is a fraction leſs than unity, the expreſſion $1-\frac{1}{\sqrt[n]{y}}$ will alſo be leſs than unity, ſeeing that it is equal to $\frac{\sqrt[n]{y}-1}{\sqrt[n]{y}}$. Therefore, in the firſt ſeries, the ſecond and third terms (taken together as one term) conſtitute a negative quantity, and as the ſame is alſo true of the fourth and fifth, and ſo on; the amount of all the terms after the firſt is a negative quantity, that is a quantity which is to be ſubtracted from the firſt, that we may have the value of log. *y*. Hence we may infer that

$$\log. y < nM(\sqrt[n]{y}-1).$$

And ſince, on the contrary, the terms of the ſecond ſeries are all poſitive, the amount of all the terms after the firſt is a poſitive quantity, that is, a quantity which muſt be added to the firſt to give the value of log. *y*, ſo that we have

$$\log. y > nM\left(1-\frac{1}{\sqrt[n]{y}}\right).$$

Thus we have two limits to the value of the logarithm of *y*, which, by taking the number *n* ſufficiently great may come as near to each other as we pleaſe.

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In like manner we find two limits to the value of the reciprocal to the modulus, viz.

$$\frac{1}{M} < n(\sqrt[n]{10}-1), \quad \frac{1}{M} > n\left(1-\frac{1}{\sqrt[n]{10}}\right).$$

It is evident that the difference between the two limits of log. *y*, is

$$nM\left\{(\sqrt[n]{y}-1)-\left(1-\frac{1}{\sqrt[n]{y}}\right)\right\};$$

therefore if we take either the one or the other of the two preceding expreſſions for log. *y*, the error in exceſs or defect is neceſſarily leſs than this quantity.

By theſe formulas we may depend upon having the logarithm of any number true to *m* figures, if we give to *n* ſuch a value that the root $\sqrt[n]{y}$ ſhall have *m* cyphers between the decimal point and the firſt ſignificant figure on the right. So that in general, as the error is the ſmaller according as *n* the exponent of the root is greater, we may conclude that it becomes nothing, or may be reckoned as nothing, when *n* is taken indefinitely great; and this being the caſe, we may conclude that either of theſe expreſſions

$$nM(\sqrt[n]{y}-1), \quad nM\left(1-\frac{1}{\sqrt[n]{y}}\right)$$

is the accurate value of log. *y*.

The beſt manner of applying the preceding formula is to take ſome power of the number 2 for *n*; for by doing ſo, the root $\sqrt[n]{y}$ may be found by a repetition of extractions of the ſquare root only. It was in this way that Briggs calculated the firſt logarithms; and he remarked, that if in performing the ſucceſſive extractions of the ſquare root, he at laſt obtained twice as many decimal places as there were cyphers after the decimal point, the integer before it being unity, then the decimal part of this root was exactly the half of that which went before; ſo that the decimal parts of the two roots were to each in the ſame proportion as their logarithms: now this is an evident conſequence of the preceding formula.

To give an example of the application of the formula, let it be required to find the numerical value of M, the modulus of the common ſyſtem of logarithms, which, as it is the reciprocal of the Napierean logarithm of 10 is equal to

$$\frac{1}{n} \times \frac{1}{\sqrt[n]{10}-1} \text{ nearly,}$$

when *n* is ſome very great number. Let us ſuppoſe $n = 2^{60} = 8^{20}$; then, dividing unity by 8, and this reſult again by 8, and ſo on, we ſhall after 20 diviſions have $\frac{1}{n}$, or $\frac{1}{8^{20}}$ equal to

0.00000 00000 00000 00086 73617 37988 40354.

Alſo, by extracting the ſquare root of 10, and the ſquare root of this reſult, and ſo on, after performing 60 extractions we ſhall find $\sqrt[n]{10}$ equal to

1.00000 00000 00000 00199 71742 08125 50527 03251.

Therefore, $\frac{1}{n} \times \frac{1}{{}^{n}\sqrt{10}-1}$, or M, is equal to

$$\frac{86736173798840354}{199717420812550527} = 0.4342944819.$$

As a ſecond example, let it be required to find by the ſame formula the logarithm of the number 3, which is nearly equal to

$$n\,\mathrm{M}\,({}^{n}\sqrt{3}-1) = \frac{n({}^{n}\sqrt{3}-1)}{n({}^{n}\sqrt{10}-1)} = \frac{{}^{n}\sqrt{3}-1}{{}^{n}\sqrt{10}-1},$$

n being as before a very great number. Let us ſuppoſe alſo in this caſe that $n=2^{60}$; then after 60 extractions of the ſquare root we have ${}^{n}\sqrt{3}$ equal to

$$1.00000\ 00000\ 00000\ 0095\ 28942\ 64074\ 58932.$$

Therefore, taking the value of ${}^{n}\sqrt{10}$ as found in laſt example, we have

$$\log.\ 3 = \frac{{}^{n}\sqrt{3}-1}{{}^{n}\sqrt{10}-1} = \frac{95289426407458932}{199717420812550527}$$
$$= .47712\ 11547\ 19662.$$

This method of computing logarithms is evidently attended with great labour, on account of the number of extractions of roots which it requires, to obtain a reſult true to a moderate number of places of figures. But the two ſeries, which we have given, ſerve to ſimplify and complete it. For, whatever be the number y, it is only neceſſary to proceed with the extractions of the ſquare root, till we have obtained for ${}^{n}\sqrt{y}$ a value which is unity followed by a decimal fraction; and then ${}^{n}\sqrt{y}-1$, being a fraction, its powers will alſo be fractions, which will be ſo much the ſmaller as their exponents are greater; thus a certain number of terms of the ſeries will ſerve to expreſs the logarithm to as many decimal places as may be required.

There are yet other analytical artifices by which the ſeries

$$\log.y = \mathrm{M}\left\{y-1-\tfrac{1}{2}(y-1)^2+\tfrac{1}{3}(y-1)^3-\tfrac{1}{4}(y-1)^4+\ \&c.\right\}$$

may be transformed into others which ſhall always converge, and in particular the following. Let $1+u$ be ſubſtituted in the ſeries for y; then it becomes

$$\log.\,(1+u) = \mathrm{M}\left(u-\frac{u^2}{2}+\frac{u^3}{3}-\frac{u^4}{4}+\frac{u^5}{5}-,\ \&c.\right).$$

In like manner let $1-u$ be ſubſtituted for y, and we have

$$\log.\,(1-u) = \mathrm{M}\left(-u-\frac{u^2}{2}-\frac{u^3}{3}-\frac{u^4}{4}-\frac{u^5}{5}-,\ \&c.\right).$$

Let each ſide of the latter equation be ſubtracted from the correſponding ſide of the former; the reſult on the left-hand ſide will be $\log.\,(1+u)-\log.\,(1-u)$, which, by the nature of logarithms, is equal to $\log.\,\frac{1+u}{1-u}$; and on the right-hand ſide the alternate terms of the two ſeries, having the ſame ſign, theſe will by ſubtraction deſtroy each other, ſo that we ſhall have

$$\log.\,\frac{1+u}{1-u} = 2\mathrm{M}\left\{u+\frac{u^3}{3}+\frac{u^5}{5}+\frac{u^7}{7}+,\ \&c.\right\}$$

which ſeries, by ſubſtituting z for $\frac{1+u}{1-u}$, and conſequently $\frac{z-1}{z+1}$ for u, will be otherwiſe expreſſed thus,

$$\log.z = 2\mathrm{M}\left\{\frac{z-1}{z+1}+\tfrac{1}{3}\left(\frac{z-1}{z+1}\right)^3+\tfrac{1}{5}\left(\frac{z-1}{z+1}\right)^5+\&c.\right\};$$

and this formula for the logarithm of a number is not only ſimple, but has alſo the property of converging in every poſſible caſe.

That we may give an example of the utility of this formula we ſhall employ it in the calculation of the Napierean logarithm of 2, which by the above formula will be

$$2\left(\frac{1}{3}+\frac{1}{3\cdot 3^3}+\frac{1}{5\cdot 3^5}+\frac{1}{7\cdot 3^7}+\frac{1}{9\cdot 3^9}+\ \&c.\right)$$
$$= \mathrm{A}+\tfrac{1}{3}\mathrm{B}+\tfrac{1}{5}\mathrm{C}+\tfrac{1}{7}\mathrm{D}+\tfrac{1}{9}\mathrm{E}+\ \&c.$$

where A is put for $\frac{2}{3}$, B for $\frac{2}{3^3}=\frac{\mathrm{A}}{9}$, C for $\frac{2}{3^5}=\frac{\mathrm{B}}{9}$, D for $\frac{2}{3^7}=\frac{\mathrm{C}}{9}$, &c. The calculation will be as follows.

$$\begin{aligned}
\mathrm{A} &= .666666666666\\
\mathrm{B} &= \tfrac{1}{9}\mathrm{A} = .074074074074\\
\mathrm{C} &= \tfrac{1}{9}\mathrm{B} = .008230452674\\
\mathrm{D} &= \tfrac{1}{9}\mathrm{C} = .000914494742\\
\mathrm{E} &= \tfrac{1}{9}\mathrm{D} = .000101610527\\
\mathrm{F} &= \tfrac{1}{9}\mathrm{E} = .000011290059\\
\mathrm{G} &= \tfrac{1}{9}\mathrm{F} = .000001254451\\
\mathrm{H} &= \tfrac{1}{9}\mathrm{G} = .000000139383\\
\mathrm{I} &= \tfrac{1}{9}\mathrm{H} = .000000015487\\
\mathrm{K} &= \tfrac{1}{9}\mathrm{I} = .000000001721\\
\mathrm{L} &= \tfrac{1}{9}\mathrm{K} = .000000000191\\
\mathrm{M} &= \tfrac{1}{9}\mathrm{L} = .000000000021
\end{aligned}$$

$$\begin{aligned}
\mathrm{A} &= .666666666665\\
\tfrac{1}{3}\mathrm{B} &= .024691358025\\
\tfrac{1}{5}\mathrm{C} &= .001646090535\\
\tfrac{1}{7}\mathrm{D} &= .000130642106\\
\tfrac{1}{9}\mathrm{E} &= .000011290059\\
\tfrac{1}{11}\mathrm{F} &= .000001026369\\
\tfrac{1}{13}\mathrm{G} &= .000000096496\\
\tfrac{1}{15}\mathrm{H} &= .000000009292\\
\tfrac{1}{17}\mathrm{K} &= .000000000911\\
\tfrac{1}{19}\mathrm{L} &= .000000000091\\
\tfrac{1}{21}\mathrm{M} &= .000000000001\\
\hline
\text{Nap. log. } 2 &= .693147180551
\end{aligned}$$

Thus, by a very eaſy calculation, we have obtained the Napierean logarithm of 2 true to the firſt ten places of figures; the accurate value, as far as the 12th place, being 0.693147180550.

If this very ſimple proceſs by which we have found the logarithm of 2 (the whole of which is here actually put down), be compared with the laborious calculations which muſt have been performed to have found the ſame logarithm by the method explained in the beginning of this ſection, the great ſuperiority of this method to the other, and even to the ſecond method, by which we have found the numerical value of M, and the common logarithm of 3, muſt be very apparent.

In the ſame manner as we have found the logarithm of 2 we may find thoſe of 3, 5, &c. In computing the logarithm

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logarithm of 3 the ſeries would converge by the powers of the fraction $\frac{3-1}{3+1}=\frac{1}{2}$, and in computing the logarithm of 5 it would converge by the powers of $\frac{5-1}{5+1}=\frac{2}{3}$; but in each of theſe caſes the ſeries would converge ſlower, and of courſe the labour would be greater than in computing the logarithm of 2. And if the number whoſe logarithm was required was ſtill more conſiderable; as for example 199, the ſeries would converge ſo ſlow as to be uſeleſs.

We may however avoid this inconvenience by again transforming this laſt formula into another which ſhall expreſs the logarithm of any number by means of a ſeries, and a logarithm ſuppoſed to be previouſly known. To effect this new transformation, let $\frac{1+u}{1-u}=1+\frac{z}{n}$, then, by reſolving this equation in reſpect of u, we have $u=\frac{z}{2n+z}$. Let theſe values of $\frac{1+u}{1-u}$ and u be ſubſtituted in the formula,

$$\text{log. } \frac{1+u}{1-u}=2\text{M}\left(u+\frac{u^3}{3}+\frac{u^5}{5}+\frac{u^7}{7}+\text{\&c.}\right)$$

and we have log. $\left(1+\frac{z}{n}\right)$ equal to

$$2\text{M}\left\{\frac{z}{2n+z}+\tfrac{1}{3}\left(\frac{z}{2n+z}\right)^3+\tfrac{1}{5}\left(\frac{z}{2n+z}\right)^5+\text{\&c.}\right\}$$

but log. $\left(1+\frac{z}{n}\right)=$ log. $\frac{n+z}{n}=$ log. $(n+z)-$ log. n, therefore, by ſubſtituting this value of log. $\frac{n+z}{n}$, and tranſpoſing log. n to the other ſide of the equation, we have

$$\text{log. }(n+z)=\text{log. } n+$$
$$2\text{M}\left\{\frac{z}{2n+z}+\tfrac{1}{3}\left(\frac{z}{2n+z}\right)^3+\tfrac{1}{5}\left(\frac{z}{2n+z}\right)^5+\text{\&c.}\right\}$$

By the aſſiſtance of this formula, and the known properties of logarithms, we may proceed calculating the logarithm of one number from that of another as follows.

To find the Napierean logarithm of 3 from that of 2, which has been already found. We have here $n=2$, $z=1$, and $\frac{z}{2n+z}=\frac{1}{5}$. Therefore the logarithm required is equal to

$$\text{log. }2+2\left(\frac{1}{5}+\frac{1}{3\cdot5^3}+\frac{1}{5\cdot5^5}+\frac{1}{7\cdot5^7}+\text{\&c.}\right)$$
$$=\text{log. }2+\text{A}+\tfrac{1}{3}\text{B}+\tfrac{1}{5}\text{C}+\tfrac{1}{7}\text{D}+\tfrac{1}{9}\text{E}+\text{\&c.}$$

where A is put for $\frac{2}{5}$, B for $\frac{\text{A}}{25}$, C for $\frac{\text{B}}{25}$, and ſo on.

The calculation may ſtand thus:

$\text{A} = .400000000000$
$\text{B}=\frac{1}{25}\text{A}=.016000000000$
$\text{C}=\frac{1}{25}\text{B}=.000640000000$
$\text{D}=\frac{1}{25}\text{C}=.000025600000$
$\text{E}=\frac{1}{25}\text{D}=.000001024000$
$\text{F}=\frac{1}{25}\text{E}=.000000040900$
$\text{G}=\frac{1}{25}\text{F}=.000000001638$
$\text{H}=\frac{1}{25}\text{G}=.000000000066$

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$\text{A}=.400000000000$
$\frac{1}{3}\text{B}=.005333333333$
$\frac{1}{5}\text{C}=.000128000000$
$\frac{1}{7}\text{D}=.000003657143$
$\frac{1}{9}\text{E}=.000000113778$
$\frac{1}{11}\text{F}=.000000003724$
$\frac{1}{13}\text{G}=.000000000125$
$\frac{1}{15}\text{H}=.000000000004$

.405465108108
Nap. log. 2. = .693147180551

Nap. log. 3. = 1.098612288659

This logarithm is true to 10 decimal places, the accurate value to 12 figures being 1.098612288668.

To find the Napierean logarithm of 4. This is immediately had from that of 2 by conſidering that as $4=2^2$, therefore log. 4 = log. 2 + log. 2.

Nap. log. 2 = .693147180551
2

Nap. log. 4 = 1.386294361102

This logarithm is alſo true to 10 places beſides the integer.

To find the Napierean logarithm of 5, from that of 4; we have $n=4$, $z=1$ & $\frac{z}{2n+1}=\frac{1}{9}$, therefore the logarithm of 5 is expreſſed by

$$\text{log. }4+2\left(\frac{1}{9}+\frac{1}{3\cdot9^3}+\frac{1}{5\cdot9^5}+\frac{1}{7\cdot9^7}+\text{\&c.}\right)$$
$$\text{log. }4+\text{A}+\tfrac{1}{3}\text{B}+\tfrac{1}{5}\text{C}+\tfrac{1}{7}\text{D}+\text{\&c.}$$

where $\text{A}=\frac{2}{9}$, $\text{B}=\frac{1}{81}\text{A}$, $\text{C}-\frac{1}{81}\text{B}$, &c.

The calculation.

$\text{A}=.222222222222$
$\text{B}=\frac{1}{81}\text{A}=.002743484225$
$\text{C}=\frac{1}{81}\text{B}=.000033870176$
$\text{D}=\frac{1}{81}\text{C}=.000000418150$
$\text{E}=\frac{1}{81}\text{D}=.000000005162$
$\text{F}=\frac{1}{81}\text{E}=.000000000064$

$\text{A}=.222222222222$
$\frac{1}{3}\text{B}=.000914494742$
$\frac{1}{5}\text{C}=.000006774035$
$\frac{1}{7}\text{D}=.000000059736$
$\frac{1}{9}\text{E}=.000000000574$
$\frac{1}{11}\text{F}=.000000000006$

.223143551315
Nap. log. 4 = 1.386294361102

Nap. log. 5 = 1.609437912417

This reſult is alſo correct to the firſt ten places of decimals.

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The logarithm of 6 is found from thoſe of 2 and 3 by conſidering, that becauſe $6=2\times 3$, therefore log. 6 = log. 2 + log. 3.

$$\begin{array}{r} \text{Nap. log. } 2=0.693147180551 \\ \text{Nap. log. } 3=1.098612288659 \\ \hline \text{Nap. log. } 6=1.791759469210 \end{array}$$

This reſult is correct as far as the tenth decimal place.

We might find the logarithm of 7 from the logarithm of 6, that is, from the logarithms of 3 and 2, in the ſame manner as we have found the logarithms of 5 and 3; but it may be more readily found from the logarithms of 2 and 5 by reaſoning thus. Becauſe $\frac{2\times 5^2}{7^2}=\frac{50}{49}$, therefore log. 2 + 2 log. 5 — 2 log. 7 $=\text{log.}\frac{50}{49}$, and conſequently

$$\text{log. } 7=\tfrac{1}{2}\text{ log. } 2+\text{ log. } 5-\tfrac{1}{2}\text{ log. }\frac{50}{49}$$

Now the logarithm of $\frac{50}{49}$ may be readily obtained from the formula

$$\text{log. } z=2\text{M}\left\{\frac{z-1}{z+1}+\tfrac{1}{3}\left(\frac{z-1}{z+1}\right)^3+\tfrac{1}{5}\left(\frac{z-1}{z+1}\right)^5+\&\text{c.}\right\}$$

For ſubſtituting $\frac{50}{49}$ for z, the formula gives

$$\text{Nap. log. }\frac{50}{49}=2\left(\frac{1}{99}+\frac{1}{3\cdot 99^3}+\frac{1}{5\cdot 99^5}+\&\text{c.}\right)$$
$$=\text{A}+\tfrac{1}{3}\text{B}+\tfrac{1}{5}\text{C}+\&\text{c.}$$

where $\text{A}=\frac{2}{9.11}$, $\text{B}=\frac{\text{A}}{9^2.11^2}$, $\text{C}=\frac{\text{B}}{9^2.11^2}$, &c. This ſeries converges with great rapidity, and a few of its terms will be ſufficient to give the logarithm of 7, as appears from the following operation.

$$\begin{array}{r} \text{A}=.020202020202 \\ \text{B}=\frac{1}{9^2.11^2}\text{A}=.000002061220 \\ \text{C}=\frac{1}{9^2.11^2}\text{B}=.000000000210 \end{array}$$

$$\begin{array}{r} \text{A}=.020202020202 \\ \tfrac{1}{3}\text{ B}=.000000687073 \\ \tfrac{1}{5}\text{ C}=.000000000042 \\ \hline \text{Nap. log. }\frac{50}{49}=.020202707317 \end{array}$$

$$\begin{array}{r} \tfrac{1}{2}\text{ log. } 2=0.346573590275 \\ \text{log. } 5=1.609437912417 \\ \hline 1.956011502692 \\ \tfrac{1}{2}\text{ log. }\frac{50}{49}=0.010101353658 \\ \hline \text{Nap. log. } 7=1.945910149034 \end{array}$$

This logarithm, like thoſe we found before, is correct in the firſt ten decimal places.

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The logarithms of 8, 9, and 10 are immediately obtained from thoſe of 2, 3, and 5, as follows:

$$\begin{array}{r} \text{Nap. log. } 2=0.693147180551 \\ 3 \\ \hline \text{Nap. log. } 8=2.079441541655 \end{array}$$

$$\begin{array}{r} \text{Nap. log. } 3=1.098612288659 \\ 2 \\ \hline \text{Nap. log. } 9=2.197224577318 \end{array}$$

$$\begin{array}{r} \text{Nap. log. } 2=0.693147180551 \\ \text{Nap. log. } 5=1.609437912417 \\ \hline \text{Nap. log. } 10=2.302585092968 \end{array}$$

Thus by a few calculations we have found the Napierean logarithms of the firſt ten numbers, each true to ten decimal places; and ſince the Napierean logarithm of 10 is now known, the *modulus* of the common ſyſtem, which is the reciprocal of that logarithm will alſo be known, and will be

$$\frac{1}{2.302585092968}=.4342944819$$

The common logarithms of the firſt ten numbers may now be found from the Napierean logarithms by multiplying each of the latter by the *modulus*, or dividing by its reciprocal, that is, by the Napierean logarithm of 10. And as the *modulus* of the common ſyſtem is ſo important an element in the theory of logarithms, we ſhall give its value, together with that of its reciprocal, as far as the 30th decimal place.

$$\text{M}=.434294481903251827651128918917$$

$$\frac{1}{\text{M}}=2.302585092994045684017991454684$$

The formulas we have already given are ſufficient for finding the logarithms of all numbers whatever throughout the table, but there are yet others which may often be applied with great advantage, and we ſhall now inveſtigate ſome of theſe.

Becauſe

$$\text{log. } z=2\text{M}\left\{\frac{z-1}{z+1}+\tfrac{1}{3}\left(\frac{z-1}{z+1}\right)^3+\tfrac{1}{5}\left(\frac{z-1}{z+1}\right)^5\&\text{c.}\right\}$$

If we now ſuppoſe

$$z=\frac{n^2}{n^2-1}=\frac{n^2}{(n-1)(n+1)}$$

ſo that $\frac{z-1}{z+1}=\frac{1}{2n^2-1}$, then the formula becomes

$$\text{log. }\frac{n^2}{(n-1)(n+1)}=2\text{M}\left\{\frac{1}{2n^2-1}+\right.$$
$$\left.\tfrac{1}{3}\left(\frac{1}{2n^2-1}\right)^3+\tfrac{1}{5}\left(\frac{1}{(2n^2-1)}\right)^5+\&\text{c.}\right\}$$

But log. $\frac{n^2}{(n-1)\times(n+1)}=2$ log. $n-$ log. $(n-1)-$ log. $(n+1)$, therefore, putting N for the ſeries

$$2\mathrm{M}\left\{\frac{1}{2n^2-1}+\frac{1}{3}\left(\frac{1}{2n^2-1}\right)^3+\frac{1}{5}\left(\frac{1}{2n^2-1}\right)^5+\&c.\right\}$$

we have this formula,

$$2\,\text{log. } n-\text{log. }(n-1)-\text{log. }(n+1)=\mathrm{N}$$

and hence, as often as we have the logarithms of any two of three numbers whoſe common difference is unity, the logarithm of the remaining number may be found. Example. Having given

the common log. of $9=0.95424250943$
the common log. of $10=1$;

it is required to find the common logarithm of 11.

Here we have $n=10$, ſo that the formula gives in this caſe 2 log. 10—log. 9—log. 11=N, and hence we have

$$\text{log. } 11=2\,\text{log. } 10-\text{log. } 9-\mathrm{N}.$$

$$\text{where } \mathrm{N}=\frac{2\mathrm{M}}{199}+\frac{2\mathrm{M}}{3\cdot199^3}+\&c.$$

M being .43429448190.

Calculation of N.

$$\mathrm{A}=\frac{2\mathrm{M}}{199}=.00436476866$$

$$\mathrm{B}=\frac{\mathrm{A}}{3\cdot199^2}=.00000003674$$

$$.00436480540$$

2 log. 10=2.0000000000
log. 9=0.95424250943
N=0.00436480540

log. 9+N=0.95860731483

log. 11 =1.04139268517

Here the ſeries expreſſed by N converges very faſt, ſo that two of its terms are ſufficient to give the logarithm true to 10 places of decimals. But the logarithm of 11 may be expreſſed by the logarithms of ſmaller numbers and a ſeries which converges ſtill more rapidly, by the following artifice, which will apply alſo to ſome other numbers. Becauſe the numbers 98, 99, and 100 are the products of numbers, the greateſt of which is 11, for $98=2\times7^2$, $99=9\times11$, and $100=10\times10$, it follows that if we have an equation compoſed of terms which are the logarithms of theſe three numbers, it may be reſolved into another, the terms of which ſhall be the logarithms of the number 11 and other ſmaller numbers. Now by the preceding formula, if we put 99 for n, we have

$$2\,\text{log. } 99-\text{log. } 98-\text{log. } 100=\mathrm{N}.$$

that is, ſubſtituting log. 9+log. 11 for log. 99, log. 2+2 log. 7 for log. 98, and 2 log. 10 for log. 100,

$$2\,\text{log. } 9+2\,\text{log. } 11-\text{log. } 2-2\,\text{log. } 7-2\,\text{log. } 10=\mathrm{N}.$$

and hence by tranſpoſition, &c.

$$\text{log. } 11=\tfrac{1}{2}\mathrm{N}+\tfrac{1}{2}\text{log. } 2+\text{log. } 7-\text{log. } 9+\text{log. } 10\,;$$

and in this equation.

$$\mathrm{N}=\frac{2\mathrm{M}}{19601}+\frac{1}{3}\frac{2\mathrm{M}}{19601^3}+\&c.$$

The firſt term alone of this ſeries is ſufficient to give the logarithm of 11 true to 14 places.

Another formula, by which the logarithm of a number is expreſſed by the logarithms of other numbers and a ſeries, may be found as follows.

Reſuming the formula

$$\text{log. } z=2\mathrm{M}\left\{\frac{z-1}{z+1}+\frac{1}{3}\left(\frac{z-1}{z+1}\right)^3+\frac{1}{5}\left(\frac{z-1}{z+1}\right)^5+\&c.\right\}$$

Let us aſſume

$$z=\frac{(n-1)^2(n+2)}{(n-2)(n+1)^2}=\frac{n^3-3n+2}{n^3-3n-2}$$

$$\text{then } \frac{z-1}{z+1}=\frac{2}{n^3-3n}$$

Let theſe values of z, & $\frac{z-1}{z+1}$ be ſubſtituted in the formula, and it becomes

$$\text{log } \frac{(n-1)^2(n+2)}{(n-2)(n+1)^2}=2\mathrm{M}\left\{\frac{2}{n^3-3n}+\frac{1}{3}\left(\frac{3}{n^3-3n}\right)^3+\&c.\right\}$$

But the quantity on the left-hand ſide of this equation is manifeſtly equal to 2 log. $(n-1)+$ log. $(n+2)-$ log. $(n-2)-2$ log. $(n+1)$, therefore, putting P for the ſeries.

$$2\mathrm{M}\left\{\frac{2}{n^3-3n}+\frac{1}{3}\left(\frac{2}{n^3-3n}\right)^3+\frac{1}{5}\left(\frac{2}{n^3-3n}\right)^5+\&c.\right\}$$

we have this formula.

$$\text{log. }(n+2)+2\,\text{log. }(n-1)-\text{log. }(n-2)-2\,\text{log. }(n+1)=\mathrm{P}$$

By this formula we may find, with great facility, the logarithm of any one of the four numbers $n-2$, $n-1$, $n+1$, $n+2$, having the logarithms of the other three. We may alſo employ it in the calculation of logarithms, as in the following example. Let the numbers 5, 6, 7, 8, be ſubſtituted ſucceſſively in the formula; then, obſerving that log. 6=log. 2+log. 3, and log. 8=3 log. 2, we have theſe four equations.

$$\text{log. } 7+2\,\text{log. } 2-3\,\text{log. } 3=\frac{2\mathrm{M}}{55}+\frac{2\mathrm{M}}{3\cdot55^3}+\&c.$$

$$-2\,\text{log. } 7+\text{log. } 2+2\,\text{log. } 5=\frac{2\mathrm{M}}{99}+\frac{2\mathrm{M}}{3\cdot99^3}+\&c.$$

$$4\,\text{log. } 3-4\,\text{log. } 2-\text{log. } 5=\frac{2\mathrm{M}}{161}+\frac{2\mathrm{M}}{3\cdot161^3}+\&c.$$

$$\text{log. } 5-3\,\text{log. } 3+2\,\text{log. } 7=\frac{2\mathrm{M}}{244}+\frac{2\mathrm{M}}{3\cdot244^3}+\&c.$$

Let log. 2, log. 3, log. 5 and log. 7 be now conſidered as four unknown quantities, and by reſolving theſe equations in the uſual manner, (ſee ALGEBRA, Sect. VII.) the logarithms may be determined.

Reſuming once more the formula

$$\text{log. } z=2\mathrm{M}\left\{\frac{z-1}{z+1}+\frac{1}{3}\left(\frac{z-1}{z+1}\right)^3+\&c.\right\},$$

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let $\frac{n^2(n+5)(n-5)}{(n+3)(n-3)(n+4)(n-4)}$ be ſubſtituted in it inſtead of z, then, by this ſubſtitution $\frac{z-1}{z+1}$ will become $\frac{-72}{n^4-25n^2+72}$ the formula will be transformed to

$$\log.\frac{n^2(n+5)(n-5)}{(n+3)(n-3)(n+4)(n-4)}$$
$$=-2M\left\{\frac{72}{n^4-25n^2+72}+\frac{1}{3}\left(\frac{72}{n^4-25n^2+72}\right)^3+\&c.\right\}$$

Hence, putting the latter ſide of this equation equal to Q, we have this formula,

$$\left.\begin{matrix}2\log.n+\log.(n+5)+\log.(n-5)-\log.(n+3)\\ -\log.(n-3)-\log.(n+4)-\log.(n-4)+Q\end{matrix}\right\}=0$$

which may be applied to the calculation of logarithms in the ſame manner as the former.

When it is required to find the logarithm of a high number, as for example 1231, we may proceed as follows:

$$\log.1231=\log.(1230+1)=\log.\left\{1230\left(1+\frac{1}{1230}\right)\right\}$$
$$=\log.1230+\log.\left(1+\frac{1}{1230}\right)$$

Again, $\log.1230=\log.2+\log.5+\log.123$ and $\log.$

$$123=\log.\left\{120\left(1+\frac{1}{40}\right)\right\}$$
$$=\log.120+\log.\left(1+\frac{1}{40}\right)$$

$\log.120=\log.(2^3\times3\times5)=3\log.2+\log.3+\log.5$

Therefore

$$\log.1231=4\log.2+\log.3+2\log.5+\log.\left(1+\frac{1}{40}\right)$$
$$+\log.\left(1+\frac{1}{1230}\right)$$

Thus the logarithm of the propoſed number is expreſſed by the logarithms of 2, 3, 5, and the logarithms of $1+\frac{1}{40}$, $1+\frac{1}{1230}$, all of which may be eaſily found by the formulas already delivered.

Having now explained, at conſiderable length, the theory of logarithms upon principles purely analytical, ſuch being, as we conceive, the moſt natural way of reaſoning concerning the properties of number, we ſhall conclude this ſection by ſtating briefly the ground upon which it was referred to the principles of geometry by the mathematicians of the 17th century. Let C be the centre, and CH, CK the aſymptotes of an hyperbola. In either of theſe let there be taken any number of continual proportionals CA, CB, CD, CE, &c. then if B*b*, D*d*, E*e*, &c. be drawn parallel to the other aſymptote, meeting the curve in *a*, *b*, *d*, *e*, &c. the hyperbolic ſpaces A*ab*B, B*bd*D, [illegible] E, &c. are equal to one another; alſo if ſtrai[illegible] be drawn from C to the points *a* [illegible] hyperbolic ſectors *a*C*b*, *b*C [illegible] be equal (CONIC SECTIONS Part [illegible], ſince it appears by this propoſition that the ſegments CA, CB, CD, CE, &c. of the aſymptote being taken in continued geometrical progreſſion, the correſponding hyperbolic areas A*ab*B, A*ad*D, A*ae*E, &c. conſtitute a ſeries of quantities in continued arithmetical progreſſion, it is evident that the two ſeries will have, in reſpect to each other, the ſame properties as numbers and their logarithms; ſo that, if we aſſume CA any ſegment of the aſymptote as the repreſentative of unity, and ſuppoſe CB, CD, CE, &c. to be the repreſentatives of other numbers, the hyperbolic areas A*ab*B, A*ad*D, A*ae*E will be the geometrical repreſentatives of the logarithms of theſe numbers; and ſo alſo will the hyperbolic ſectors C*ab*, C*bd*, C*de*, &c.

Let CA (the line denoting unity) be the ſide of a rhombus CA*a*L inſcribed at the vertex of the hyperbola, and let CP=*n*×CA (*n* being put for any number); draw P*p* parallel to CL meeting the hyperbola in *p*, then it may be ſhewn, by the methods uſually employed in reaſoning about curvilineal areas, that the area of the rhombus A*a*LC is to the hyperbolic area A*ap*P as 1 to the Napierean logarithm of the number *n*. Therefore if the hyperbola be equilateral, ſo that A*a*L*c* is a ſquare, &c. conſequently its area=1×1=1, the Napierean logarithm of *n*, and the area A*ap*P may be taken as the mutual repreſentatives of each other. It is this circumſtance which induced mathematicians to call theſe logarithms *hyperbolic*. But with equal propriety might the logarithms of any other ſyſtem be called hyperbolic, as they may be equally expreſſed by the area of the equilateral hyperbola, or indeed by the area of any hyperbola whatever, (ſee FLUXIONS § 152. Ex. 5.)

SECT. II.

DESCRIPTION AND USE OF THE TABLE.

Deſcriptio and Uſe o the Table

THE common ſyſtem of logarithms is ſo conſtructed, that, 0 being the logarithm of unity, or 1, the logarithm of 10 is 1; by which it happens that the logarithm of 100 is 2, that of 1000 is 3, and ſo on. Alſo, the logarithm of $\frac{1}{10}$, or .1, is —1, that is, 1 conſidered as ſubtractive; or, in the language of algebra, *minus* one; and the logarithm of $\frac{1}{100}$, or .01, is —2; and the logarithm of .001 is —3, and ſo on, as in the following ſhort table.

Numbers.	Logarithms.
. . . .	. .
.001	—3
.00	—2
.1	—1
1	0
10	1
100	2
1000	3
&c.	&c.

As the terms of the geometrical progreſſion 1, 10, 100, &c. continued backwards as well as forward, are the only numbers whoſe logarithms are integers; the logarithms of all other numbers whatever muſt be either fractions, or mixt numbers. Accordingly, the logarithms of all numbers, whether integer or mixt, between 1 and 10 are expreſſed by decimal fractions leſs than

Deſcription and Uſe of the Table.

than unity. The logarithms of numbers between 10 and 100 are expreſſed by mixt numbers compoſed of unity and a decimal fraction. The logarithms of numbers between 100 and 1000 are expreſſed by mixt numbers compoſed of the number 2 and a decimal fraction, and ſo on. On the other hand, the logarithm of any vulgar or decimal fraction leſs than 1, but greater than $\frac{1}{10}$ or .1, will be ſome negative decimal fraction between 0 and —1; and the logarithm of any fraction between .1 and .01, will be a negative mixed quantity between —1 and —2, and ſo on.

But it muſt be remarked, that any fraction, or mixt number, conſidered as entirely negative, may always be transformed into another mixt number of equal value, that ſhall have its integer part negative, but its fractional part poſitive, by diminiſhing the integer by unity, and increaſing the fractional part by the ſame quantity. Thus let the mixt quantity be $-2\frac{3}{10}$, which may be alſo written thus $-2-\frac{3}{10}$. Let the integer —2 be diminiſhed by 1, and the reſult is $-2-1=-3$. Alſo, let the fraction $-\frac{3}{10}$ be increaſed by 1, and it becomes $-\frac{3}{10}+1=+\frac{7}{10}$; therefore the fraction $-2\frac{3}{10}$ or -2.3, when transformed, is $-3+\frac{7}{10}$, or $-3+.7$, which may be written thus, $\bar{3}.7$; where the negative ſign is placed over the integer to indicate that it is the only part of the expreſſion that is conſidered as negative, the other part, viz. .7, being reckoned poſitive.

Since therefore any fractional or mixt quantity, conſidered as entirely negative, is equivalent to another mixt quantity, the integer part of which only is negative, but the fractional part poſitive, it is evident that inſtead of expreſſing the logarithms of fractions by numbers conſidered as entirely negative, we may expreſs them by numbers having their integer parts negative, and their decimal parts poſitive; and it is uſual ſo to expreſs them. Thus the logarithm of .03, inſtead of being expreſſed by -1.52288, that is, by $-1-.52288$, is uſually expreſſed by $\bar{2}.47712$, by which is to be underſtood $-2+.47712$. Again, the logarithm of .7, which, if conſidered as entirely negative, would be $-.15490$, is otherwiſe $\bar{1}.84510$.

As the logarithms of any ſeries of numbers forming a geometrical progreſſion, the common ratio of which is 10, will exceed each other by the logarithm of 10, that is, by 1, it follows that the logarithms of all numbers denoted by the ſame figures, and differing only in the poſition of the decimal point, will have the decimal part of their logarithms the ſame; but the integers ſtanding before the decimals will be different, and will be poſitive or negative, according as the numbers are whole or fractional, as in theſe examples.

Numbers.	Logarithms.
69150	4.83980
6915	3.83980
691.5	2.83980
69.15	1.83980
6.915	0.83980
.6915	$\bar{1}$.83980
.06915	$\bar{2}$.83980

The integer figure of a logarithm, is called its *index* or *characteriſtic*; and *it is always leſs by one than the number of integer figures which the natural number conſiſts of; or it is equal to the diſtance of the firſt figure from the place of units or firſt place of integers, whether on the left or on the right of it.*

The table of logarithms given at the end of this article, contains the decimal parts of the logarithms of all numbers from 1 to 10,000; and indeed of all numbers which can be expreſſed by four figures, preceded or followed by any numbers of cyphers, ſuch as the numbers 367500, .002795, &c. The index, however, is not put down; but it is eaſily ſupplied by the rule which has juſt now been given. The table alſo contains the differences of the logarithms of all numbers from 1000 to 10,000, by means of which the logarithm of any number conſiſting of five figures may be eaſily obtained.

1. *To find the logarithm of any number conſiſting of four or any ſmaller number of figures.* Look for the number in the columns titled at the top *Numbers*; and in the ſame line with it, on the right, in the column of logarithms, will be found the decimal part of its logarithm, to which ſupply the decimal point, and its index according to rule delivered above. Thus,

The log. of 9 is found to be	0.95424
of 17	1.23045
of 2.63	0.41996
of 13.42	1.12775
of 6280	3.79796
of 3749	3.57392
of .6027	$\bar{1}$.78010
of .00234	$\bar{3}$.36922
of 852600	5.93075

2. *To find the logarithm of a number conſiſting of five figures.*

Find the decimal part of the logarithm of the firſt four figures of the number, (that is, find the logarithm of the propoſed number as if the laſt figure were a cypher), by the preceding rule; and find the difference between that logarithm and the next greater, as given in the column of differences (to the right of the column of logarithms). Then ſtate this proportion:

As 10,
To the tabular difference,
So is the laſt, or fifth figure of the number,
To a fourth proportional;

which being added to the former logarithm, and the decimal point and index ſupplied, will be the logarithm ſought.

Example. Required the logarithm of 186.47. The decimal part of the logarithm of the firſt four figures, viz. 1864, is .27045, and the difference oppoſite to it in the column marked D on the top is 23. Therefore we have this proportion:

$$10 : 23 :: 7 : \frac{7\times 23}{10}=16.1$$

The fourth proportional is 16.1, or, rejecting the decimal part, .16 nearly; therefore,

to log. of 1684	.27045
add	16
the log. of 168.47 is	2.27061

Description and Use of the Tables.

3. *To find the logarithm of a vulgar fraction or mixt number.*

Either reduce the vulgar fraction to a decimal, and find its logarithm as above, or elſe (having reduced the mixt number to an improper fraction) ſubtract the logarithm of the denominator from the logarithm of the numerator, and the remainder will be the logarithm of the fraction ſought.

Ex. 1. To find the logarithm of $\frac{3}{16}$.

From the log. of 3	0.47712
Subtract the log. of 16	1.20412
Rem. log. of $\frac{3}{16}$ or of .1875	$\bar{1}$.27300

Here, as the lower number is greater than the upper, the remainder muſt be negative; the ſubtraction, however, is ſo performed, that the decimal part of the remainder is poſitive, and the integer negative.

Ex. 2. To find the logarithm of 13¾ or $\frac{55}{4}$.

From log. of 55	1.74036
Subtract log. of 4	0.60206
Rem. log. of 13¾ or of 13.75	1.13830

4. *To find the number correſponding to any given logarithm.*

Seek the decimal part of the propoſed logarithm in the column of logarithms, and if it be found exactly, the figures of the number correſponding to it will be found in the ſame line with it in the column of numbers. If the index of the given logarithm is 3, the four figures of the numbers thus found are integers; but if it be 2, the three firſt figures are integers, and the fourth is a decimal, and ſo on; the number of integer figures before the decimal point being always one greater than the index, if it be poſitive; but if it be negative, the number ſought will be a decimal, and the number of cyphers between the decimal point and firſt ſignificant figure will be one leſs than the index.—*Examples.* The number correſponding to the logarithm 3.57392 is 3749. The number correſponding to 1.12775 is 13.42. The number correſponding to $\bar{3}$.36922 is .00234, and ſo on.

But if the given logarithm is not exactly found in the table, ſubtract the next leſs tabular logarithm from it, and take the difference between that logarithm, and the next greater (as given in the column of differences). Then ſtate this proportion:

As the difference, taken from the table,
Is to 10,
So is the difference between the given logarithm and the next leſs,
To a fourth proportional,

which being annexed to the four figures correſponding to the logarithm next leſs than the given one, will be the logarithm required.

Example. Find the number anſwering to the logarithm 4.13278.

The dec. part of given log. is	.13278
That of next leſs, viz. log. of 1357, is	.13258
Difference	20

The tabular difference is 32, therefore we have this proportion,

$$32 : 10 :: 20 : \frac{20 \times 10}{32} = 6 \text{ nearly.}$$

Therefore the number correſponding to the propoſed logarithm is .13576.

In like manner may the numbers to the following logarithms be found.

Logarithms.	Numbers.
1.23457	17.162
$\underline{3}$.73430	5423 8
1.09214	.12363
4.61230	40954

The *table of logarithms of numbers* is followed by a *Table of Logarithmic Sines and Tangents, for every minute of the quadrant, with their differences.* For the explanation of this table we refer to TRIGONOMETRY, to which branch of mathematics it is intended to be applied.

We ſhall now give practical rules, illuſtrated by examples, for performing the different operations of arithmetic by logarithms.

MULTIPLICATION BY LOGARITHMS.

RULE.

TAKE out the logarithms of the factors from the table; then add them together, and their ſum will be the logarithm of the product required. Then find, by inſpection of the table, the natural number anſwering to their ſum, and it will be the product required.

Obſerving to add what is to be carried from the decimal part of the logarithm to the poſitive index or indices, or elſe ſubtract it from the negative.

Alſo adding the indices together when they are of the ſame kind, that is, both poſitive or both negative; but ſubtracting the leſs from the greater when the one is poſitive and the other negative, and prefixing the ſign of the greater to the remainder.

EXAMPLES.

Ex. 1. To multiply 2.314 by 50.62.

	Numbers.	Logarithms.
	2.314.	0.36436
	50.62	1.70432
Product	117.13	2.06868

Ex. 2. To multiply 2.5819 by 3.4573.

	Numbers.	Logarithms.
	2.5819	0.41194
	3.4573	0.53874
Prod.	8.9265	0.95068

Ex. 3. To multiply 39.02, and 597.16, and .03147 together.

	Numbers.	Logarithms.
	39.02	1.59129
	597.16	2.77609
	.03147	$\bar{2}.49790$
Prod.	733.3	2.86528

Here the sum of the poſitive indices, together with 1 which we carry, is 4, and from this we ſubtract 2, becauſe of the negative index —2.

Ex. 4. To multiply 3.586 and 2.1046, and 0.8372 and 0.0294 all together.

Numbers.	Logarithms.
3.586	0.55461
2.1046	0.32317
0.8372	$\bar{1}.92283$
0.0294	$\bar{2}.46835$
	$\bar{1}.26896$

Here the 2 to carry cancels the —2, and there remains the —1 to ſet down.

DIVISION BY LOGARITHMS.

RULE.

SUBTRACT the logarithm of the diviſor from the logarithm of the dividend, and the number anſwering to the remainder will be the logarithm of the quotient required.

Obſerving to change the ſign of the index of the diviſor from poſitive to negative, or from negative to poſitive; then take the ſum of the indices if they be of the ſame name, or their difference when they have different ſigns, with the ſign of the greater for the index to the logarithm of the quotient.

Alſo, when 1 is borrowed in the left-hand place of the decimal part of the logarithm, add it to the index of the diviſor when that index is poſitive, but ſubtract it when negative; then let the index ariſing from thence be changed, and work with it as before.

EXAMPLES.

Ex. 1. To divide 24163 by 4567.

	Numbers.	Logarithms.
Divid.	24163	4.38315
Diviſ.	4567	3.65963
Quot.	5.2908	0.72352

Ex. 2. To divide 37.15 by 523.76.

	Numbers.	Logarithms.
Divid.	37.15	1.56996
Div.	523.76	2.71913
Quot.	.07093	$\bar{2}.85083$

Ex. 3. Divide .06314 by .007241.

	Numbers.	Logarithms.
Divid.	.06314	$\bar{2}.80030$
Diviſ.	.007241	$\bar{3}.85980$
Quot.	8.720	0.94050

Here 1 carried from the decimals to the —3 makes it —2, which taken from the other —2, leaves 0 remaining.

Ex. 4. Divide .7438 by 12.947.

	Numbers.	Logarithms.
Divid.	.7438	$\bar{1}.87146$
Diviſ.	12.947	1.11218
Quot.	.057449	$\bar{2}.75928$

Here the 1 taken from the —1 makes it become —2 to ſet down.

PROPORTION BY LOGARITHMS.

RULE.

ADD the logarithms of the ſecond and third terms, and from the ſum ſubtract the logarithm of the firſt term by the foregoing rules, the remainder will be the logarithm of the fourth term required.

Or in any compound proportion whatever, add together the logarithms of all the terms that are to be multiplied; and from that ſum take the ſum of the others, the remainder will be the logarithm of the anſwer.

But, inſtead of ſubtracting any logarithm, we may add its *arithmetical complement*, and the reſult will be the ſame. By the arithmetical complement is meant the logarithm of the reciprocal of the given number, or the remainder by taking the given logarithm from 0, or from 10, changing the beginning of the ſcale from 0 to 10; the eaſieſt way of doing which is to begin at the left hand, and ſubtract each figure from 9, except the laſt ſignificant figure on the right hand, which muſt be ſubtracted from 10. But when the index is negative, it muſt be added to 9, and the reſt ſubtracted as before; and for every complement that is added ſubtract 10 from the laſt ſum of the indices.

EXAMPLES.

Ex. 1. Find a fourth proportional to 72.34, 2.519, and 357.48.

	Numbers.	Logarithms.
As	72.34	1.85938
To	2.519	0.40123
So is	357.48	2.55325
		2.95448
To	12.448	1.09510

Here the logarithms of the ſecond and third terms are added together, and the logarithm of the firſt term is ſubtracted from the ſum; but by taking the arithme-

Deſcription and Uſe of the Table.

cal complement of the firſt term, the work might ſtand thus:

As	72.34	Comp. log.	8.14062
To	2.519		0.40123
So is	357.48		2.55325
To	12.448		1.09510

Ex. 2. If the intereſt of 100l. for a year, or 365 days, be 4.5, What will be the intereſt of 279.25l. for 274 days.

As	100	Comp. log.	8.00000
	365		7.43771
To	279.25		2.44599
	274		2.43775
So is	4.5		0.65321
To	9.4333		0.97466

Here, inſtead of ſubtracting the ſum of the logarithms of 100 and 365, we add the arithmetical complement of the logarithms of theſe numbers, and ſubtract 20 from the ſum of the indices.

INVOLUTION BY LOGARITHMS.

RULE.

MULTIPLY the logarithm of the given number by the index of the power, and the number anſwering to the product will be the power required.

Note.—In multiplying a logarithm with a negative index by a poſitive number, the product will be negative. But what is to be carried from the decimal part of the logarithm will always be poſitive. And therefore the difference will be the index of the product, and is always to be made of the ſame kind with the greater.

EXAMPLES.

Ex. 1. To ſquare the number 2.579.

	Number.	Logarithm.
Root	2.569	0.41145
The index		2
Power	6.6513	0.82290

Ex. 2. To find the cube of 3.0715.

	Number.	Logarithm.
Root	3.0715	0.48735
The index		3
Power	28.976	1.46205

Ex. 3. To raiſe .09163 to the fourth power.

	Number.	Logarithm.
Root	.09163	$\bar{2}$.96204
		4
Power	.000070495	$\bar{5}$.84816

Here 4 times the negative index being —8, and 3 to carry, the difference —5, is the index of the product.

Deſcription and Uſe of the Table.

Ex. 4. To raiſe 1.0045 to the 365th power.

	Number.	Logarithm.
Root	1.0045	0.00195
The index		365
		975
		1170
		585
Power.	5.1493	.71175

EVOLUTION BY LOGARITHMS.

RULE.*

DIVIDE the logarithm of the number by the index of the root, and the number anſwering to the quotient is the root ſought.

When the index of the logarithm to be divided is negative, and does not exactly contain the diviſor without ſome remainder, increaſe the index by ſuch a number as will make it exactly diviſible by the index of the root, carrying the units borrowed as ſo many tens to the left-hand place of the decimal, and then divide as in whole numbers.

EXAMPLES.

Ex. 1. Find the ſquare root of 2.

	Number.	Logarithm.
Power	.2	2)0.30103
Root	1.4142	0.15051

Ex. 2. Find the 10th root of 365.

	Number.	Logarithm.
Power	365	10)2.56229
Root	1.804	0.25623

Ex. 3. To find $\sqrt{.093}$.

	Number.	Logarithm.
Power	.093	2)$\bar{2}$.96848
Root	.30496	$\bar{1}$.48424

Here the diviſor 2 is contained exactly in the negative index —2, and therefore the index of the quotient is —1.

Ex. 4. To find $\sqrt[3]{.00048}$.

	Number.	Logarithm.
Power	.00048	3)$\bar{4}$.68124
Root	.078298	$\bar{2}$.89375

Here the diviſor 3, not being exactly contained in —4, it is augmented by 2 to make up 6, in which the diviſor is contained juſt 2 times, then the 2 thus borrowed being carried to the decimal figure 6, makes 26, which divided by 3 gives 8, &c.

LOGARITHMS OF NUMBERS.

N.	Log.	N.	Log.	N.	Log.	N.	Log.	N.	Log.	N.	Log.	N.	Log.	N.	Log.
		60	77815	120	07918	180	25527	240	38021	300	47712	360	55630	420	62325
1	00000	61	78533	121	08279	181	25768	241	38202	301	47857	361	55751	421	62428
2	30103	62	79239	122	08636	182	26007	242	28382	302	48001	362	55871	422	62531
3	47712	63	79934	123	08991	183	26245	243	38561	303	48144	363	55991	423	62634
4	60206	64	80618	124	09342	184	26482	244	38739	304	48287	364	56110	424	62737
5	69897	65	81291	125	09691	185	26717	245	38917	305	48430	365	56229	425	62839
6	77815	66	81954	126	10037	186	26951	246	39094	306	48572	366	56348	426	62941
7	84510	67	82607	127	10380	187	27184	247	39270	307	48714	367	56467	427	63043
8	90309	68	83251	128	10721	188	27416	248	39445	308	48855	368	56585	428	63144
9	95424	69	83885	129	11059	189	27646	249	39620	309	48996	369	56703	429	63246
10	00000	70	84510	130	11394	190	27875	250	39794	310	49136	370	56820	430	63347
11	04139	71	85126	131	11727	191	28103	251	39967	311	49276	371	56937	431	63448
12	07918	72	85733	132	12057	192	28330	252	40140	312	49415	372	57054	432	63548
13	11394	73	86332	133	12385	193	28556	253	40312	313	49554	373	57171	433	63649
14	14613	74	86923	134	12710	194	28780	254	40483	314	49693	374	57287	434	63749
15	17609	75	87506	135	13033	195	29003	255	40654	315	49831	375	57403	435	63849
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6762	83008	6	6822	83391	7	6882	83771	7	6942	84148	7	7002	84522	6	7062	84893	6	7122	85260	6	7182	85625	6
6763	83014	6	6823	83398	6	6883	83778	6	6943	84155	6	7003	84528	7	7063	84899	6	7123	85266	6	7183	85631	6
6764	83020	7	6824	83404	6	6884	83784	6	6944	84161	6	7004	84535	6	7064	84905	6	7124	85272	6	7184	85637	6
6765	83027	6	6825	83410	7	6885	83790	7	6945	84167	6	7005	84541	6	7065	84911	6	7125	85278	7	7185	85643	6
6766	83033	7	6826	83417	6	6886	83797	6	6946	84173	7	7006	84547	6	7066	84917	7	7126	85285	6	7186	85649	6
6767	83040	6	6827	83423	6	6887	83803	6	6947	84180	6	7007	84553	6	7067	84924	6	7127	85291	6	7187	85655	6
6768	83046	6	6828	83429	7	6888	83809	7	6948	84186	6	7008	84559	7	7068	84930	6	7128	85297	6	7188	85661	6
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6770	83059	6	6830	83442	6	6890	83822	6	6950	84198	7	7010	84572	6	7070	84942	6	7130	85309	6	7190	85673	6
6771	83065	7	6831	83448	7	6891	83828	7	6951	84205	6	7011	84578	6	7071	84948	6	7131	85315	6	7191	85679	6
6772	83072	6	6832	83455	6	6892	83835	6	6952	84211	6	7012	84584	6	7072	84954	6	7132	85321	6	7192	85685	6
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6774	83085	6	6834	83467	7	6894	83847	6	6954	84223	7	7014	84597	6	7074	84967	6	7134	85333	6	7194	85697	6
6775	83091	6	6835	83474	6	6895	83853	7	6955	84230	6	7015	84603	6	7075	84973	6	7135	85339	6	7195	85703	6
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7202	85745	6	7262	86106	6	7322	86463	6	7382	86817	6	7442	87169	6	7502	87518	5	7562	87864	5	7622	88207	6
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7209	85788	6	7269	86147	6	7329	86504	6	7389	86859	5	7449	87210	6	7509	87558	6	7569	87904	6	7629	88247	5
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7235	85944	6	7295	86303	5	7355	86658	6	7415	87011	6	7475	87361	6	7535	87708	6	7595	88053	5	7655	88395	5
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7246	86010	6	7306	86368	6	7366	86723	6	7426	87075	6	7486	87425	6	7546	87772	5	7606	88116	5	7666	88457	6
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7250	86034	6	7310	86392	6	7370	86747	6	7430	87099	6	7490	87448	6	7550	87795	5	7610	88138	6	7670	88480	5
7251	86040	6	7311	86398	6	7371	86753	6	7431	87105	6	7491	87454	6	7551	87800	6	7611	88144	6	7671	88485	6
7252	86046	6	7312	86404	6	7372	86759	5	7432	87111	5	7492	87460	6	7552	87806	6	7612	88150	6	7672	88491	6
7253	86052	6	7313	86410	5	7373	86764	6	7433	87116	6	7493	87466	5	7553	87812	6	7613	88156	5	7673	88497	5
7254	86058	6	7314	86415	6	7374	86770	6	7434	87122	6	7494	87471	6	7554	87818	5	7614	88161	6	7674	88502	6
7255	86064	6	7315	86421	6	7375	86776	6	7435	87128	6	7495	87477	6	7555	87823	6	7615	88167	6	7675	88508	5
7256	86070	6	7316	86427	6	7376	86782	6	7436	87134	6	7496	87483	6	7556	87829	6	7616	88173	5	7676	88513	6
7257	86076	6	7317	86433	6	7377	86788	6	7437	87140	6	7497	87489	6	7557	87835	6	7617	88178	6	7677	88519	6
7258	86082	6	7318	86439	6	7378	86794	6	7438	87146	5	7498	87495	5	7558	87841	5	7618	88184	6	7678	88525	5
7259	86088	6	7319	86445	6	7379	86800	6	7439	87151	6	7499	87500	6	7559	87846	6	7619	88190	5	7679	88530	6
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7682	88547	5	7742	88885	5	7802	89221	6	7862	89553	5	7922	89883	5	7982	90211	5	8042	90536	5	8102	90859	5
7683	88553	6	7743	88891	6	7803	89226	5	7863	89559	6	7923	89889	6	7983	90217	6	8043	90542	6	8103	90865	6
7684	88559	6	7744	88897	6	7804	89232	6	7864	89564	5	7924	89894	5	7984	90222	5	8044	90547	5	8104	90870	5
7685	88564	5	7745	88902	5	7805	89237	5	7865	89570	6	7925	89900	6	7985	90227	5	8045	90553	6	8105	90875	5
7686	88570	6	7746	88908	6	7806	89243	6	7866	89575	5	7926	89905	5	7986	90233	6	8046	90558	5	8106	90881	6
7687	88576	6	7747	88913	5	7807	89248	5	7867	89581	6	7927	89911	6	7987	90238	5	8047	90563	5	8107	90886	5
7688	88581	5	7748	88919	6	7808	89254	6	7868	89586	5	7928	89916	5	7988	90244	6	8048	90569	6	8108	90891	5
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7693	88610	6	7753	88947	6	7813	89282	6	7873	89614	5	7933	89944	6	7993	90271	5	8053	90596	6	8113	90918	5
7694	88615	5	7754	88953	6	7814	89287	5	7874	89620	6	7934	89949	5	7994	90276	5	8054	90601	5	8114	90924	6
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7696	88627	6	7756	88964	6	7816	89298	5	7876	89631	6	7936	89960	5	7996	90287	5	8056	90612	5	8116	90934	5
7697	88632	5	7757	88969	5	7817	89304	6	7877	89636	5	7937	89966	6	7997	90293	6	8057	90617	5	8117	90940	6
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7700	88649	6	7760	88986	5	7820	89321	6	7880	89653	6	7940	89982	5	8000	90309	5	8060	90634	6	8120	90956	6
7701	88655	6	7761	88992	6	7821	89326	5	7881	89658	5	7941	89988	6	8001	90314	5	8061	90639	5	8121	90961	5
7702	88660	5	7762	88997	5	7822	89332	6	7882	89664	6	7942	89993	5	8002	90320	6	8062	90644	5	8122	90966	5
7703	88666	6	7763	89003	6	7823	89337	5	7883	89669	5	7943	89998	5	8003	90325	5	8063	90650	6	8123	90972	6
7704	88672	6	7764	89009	6	7824	89343	6	7884	89675	6	7944	90004	6	8004	90331	6	8064	90655	5	8124	90977	5
7705	88677	5	7765	89014	5	7825	89348	5	7885	89680	5	7945	90009	5	8005	90336	5	8065	90660	5	8125	90982	5
7706	88683	6	7766	89020	6	7826	89354	6	7886	89686	6	7946	90015	6	8006	90342	6	8066	90666	6	8126	90988	6
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7710	88705	5	7770	89042	5	7830	89376	5	7890	89708	6	7950	90037	6	8010	90363	5	8070	90687	5	8130	91009	5
7711	88711	6	7771	89048	6	7831	89382	6	7891	89713	5	7951	90042	5	8011	90369	6	8071	90693	6	8131	91014	5
7712	88717	6	7772	89053	5	7832	89387	5	7892	89719	6	7952	90048	6	8012	90374	5	8072	90698	5	8132	91020	6
7713	88722	5	7773	89059	6	7833	89393	6	7893	89724	5	7953	90053	5	8013	90380	6	8073	90703	5	8133	91025	5
7714	88728	6	7774	89064	5	7834	89398	5	7894	89730	6	7954	90059	6	8014	90385	5	8074	90709	6	8134	91030	5
7715	88734	6	7775	89070	6	7835	89404	6	7895	89735	5	7955	90064	5	8015	90390	5	8075	90714	5	8135	91036	6
7716	88739	5	7776	89076	6	7836	89409	5	7896	89741	6	7956	90069	5	8016	90396	6	8076	90720	6	8136	91041	5
7717	88745	6	7777	89081	5	7837	89415	6	7897	89746	5	7957	90075	6	8017	90401	5	8077	90725	5	8137	91046	5
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7719	88756	6	7779	89092	5	7839	89426	5	7899	89757	5	7959	90086	6	8019	90412	5	8079	90736	6	8139	91057	5
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7721	88767	5	7781	89104	6	7841	89437	5	7901	89768	5	7961	90097	6	8021	90423	6	8081	90747	6	8141	91068	6
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7723	88779	6	7783	89115	6	7843	89448	5	7903	89779	5	7963	90108	6	8023	90434	6	8083	90757	5	8143	91078	5
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7725	88790	6	7785	89126	6	7845	89459	5	7905	89790	5	7965	90119	6	8025	90445	6	8085	90768	5	8145	91089	5
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7740	88874	6	7800	89209	5	7860	89542	5	7920	89873	6	7980	90200	5	8040	90526	6	8100	90849	6	8160	91169	5

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8164	91190	6	8224	91508	6	8284	91824	5	8344	92137	6	8404	92449	5	8464	92758	5	8524	93064	5	8584	93369	5
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8201	91387	5	8261	91703	6	8321	92018	5	8381	92330	5	8441	92639	6	8501	92947	5	8561	93252	6	8621	93556	5
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8203	91397	6	8263	91714	5	8323	92028	5	8383	92340	5	8443	92650	5	8503	92957	5	8563	93263	5	8623	93566	5
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8206	91413	5	8266	91730	5	8326	92044	5	8386	92355	6	8446	92665	5	8506	92973	5	8566	93278	5	8626	93581	5
8207	91418	6	8267	91735	5	8327	92049	5	8387	92361	5	8447	92670	5	8507	92978	5	8567	93283	5	8627	93586	5
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8210	91434	6	8270	91751	5	8330	92065	5	8390	92376	5	8450	92686	5	8510	92993	5	8570	93298	5	8630	93601	5
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8213	91450	5	8273	91766	6	8333	92080	5	8393	92392	5	8453	92701	5	8513	93008	5	8573	93313	5	8633	93616	5
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8215	91461	5	8275	91777	5	8335	92091	5	8395	92402	5	8455	92711	5	8515	93018	6	8575	93323	5	8635	93626	5
8216	91466	5	8276	91782	5	8336	92096	5	8396	92407	5	8456	92716	6	8516	93024	5	8576	93328	6	8636	93631	5
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8218	91477	5	8278	91793	5	8338	92106	5	8398	92418	5	8458	92727	5	8518	93034	5	8578	93339	5	8638	93641	5
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8642	93661	5	8702	93962	5	8762	94260	5	8822	94557	5	8882	94851	5	8942	95143	4	9002	95434	5	9062	95722	4
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8650	93702	5	8710	94002	5	8770	94300	5	8830	94596	5	8890	92890	5	8950	95182	5	9010	95472	4	9070	95761	5
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8658	93742	5	8718	94042	5	8778	94340	5	8838	94635	5	8898	94929	5	8958	95221	5	9018	95511	5	9078	95799	5
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8662	93762	5	8722	94062	5	8782	94359	5	8842	94655	5	8902	94949	5	8962	95240	4	9022	95530	5	9082	95818	5
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8672	93812	5	8732	94111	5	8792	94409	5	8852	94704	5	8912	94998	5	8972	95289	5	9032	95578	4	9092	95866	5
8673	93817	5	8733	94116	5	8793	94414	5	8853	94709	5	8913	95002	4	8973	95294	5	9033	95583	5	9093	95871	5
8674	93822	5	8734	94121	5	8794	94419	5	8854	94714	5	8914	95007	5	8974	95299	5	9034	95588	5	9094	95875	4
8675	93827	5	8735	94126	5	8795	94424	5	8855	94719	5	8915	95012	5	8975	95303	4	9035	95593	5	9095	95880	5
8676	93832	5	8736	94131	5	8796	94429	5	8856	94724	5	8916	95017	5	8976	95308	5	9036	95598	5	9096	95885	5
8677	93837	5	8737	94136	5	8797	94433	4	8857	94729	5	8917	95022	5	8977	95313	5	9037	95602	4	9097	95890	5
8678	93842	5	8738	94141	5	8798	94438	5	8858	94734	5	8918	95027	5	8978	95318	5	9038	95607	5	9098	95895	5
8679	93847	5	8739	94146	5	8799	94443	5	8859	94738	4	8919	95032	5	8979	95323	5	9039	95612	5	9099	95899	4
8680	93852	5	8740	94151	5	8800	94448	5	8860	94743	5	8920	95036	4	8980	95328	5	9040	95617	5	9100	95904	5
8681	93857	5	8741	94156	5	8801	94453	5	8861	94748	5	8921	95041	5	8981	95332	4	9041	95622	5	9101	95909	5
8682	93862	5	8742	94161	5	8802	94458	5	8862	94753	5	8922	95046	5	8982	95337	5	9042	95626	4	9102	95914	5
8683	93867	5	8743	94166	5	8803	94463	5	8863	94758	5	8923	95051	5	8983	95342	5	9043	95631	5	9103	95918	4
8684	93872	5	8744	94171	5	8804	94468	5	8864	94763	5	8924	95056	5	8984	95347	5	9044	95636	5	9104	95923	5
8685	93877	5	8745	94176	5	8805	94473	5	8865	94768	5	8925	95061	5	8985	95352	5	9045	95641	5	9105	95928	5
8686	93882	5	8746	94181	5	8806	94478	5	8866	94773	5	8926	95066	5	8986	95357	5	9046	95646	5	9106	95933	5
8687	93887	5	8747	94186	5	8807	94483	5	8867	94778	5	8927	95071	5	8987	95361	4	9047	95650	4	9107	95938	5
8688	93892	5	8748	94191	5	8808	94488	5	8868	94783	5	8928	95075	4	8988	95366	5	9048	95655	5	9108	95942	4
8689	93897	5	8749	94196	5	8809	94493	5	8869	94787	4	8929	95080	5	8989	95371	5	9049	95660	5	9109	95947	5
8690	93902	5	8750	94201	5	8810	94498	5	8870	94792	5	8930	95085	5	8990	95376	5	9050	95665	5	9110	95952	5
8691	93907	5	8751	94206	5	8811	94503	5	8871	94797	5	8931	95090	5	8991	95381	5	9051	95670	5	9111	95957	5
8692	93912	5	8752	94211	5	8812	94507	4	8872	94802	5	8932	95095	5	8992	95386	5	9052	95674	4	9112	95961	4
8693	93917	5	8753	94216	5	8813	94512	5	8873	94807	5	8933	95100	5	8993	95390	4	9053	95679	5	9113	95966	5
8694	93922	5	8754	94221	5	8814	94517	5	8874	94812	5	8934	95105	5	8994	95395	5	9054	95684	5	9114	95971	5
8695	93927	5	8755	94226	5	8815	94522	5	8875	94817	5	8935	95109	4	8995	95400	5	9055	95689	5	9115	95976	5
8696	93932	5	8756	94231	5	8816	94527	5	8876	94822	5	8936	95114	5	8996	95405	5	9056	95694	5	9116	95980	4
8697	93937	5	8757	94236	5	8817	94532	5	8877	94827	5	8937	95119	5	8997	95410	5	9057	95698	4	9117	95985	5
8698	93942	5	8758	94240	4	8818	94537	5	8878	94832	5	8938	95124	5	8998	95415	5	9058	95703	5	9118	95990	5
8699	93947	5	8759	94245	5	8819	94542	5	8879	94836	4	8939	95129	5	8999	95419	4	9059	95708	5	9119	95995	5
8700	93952	5	8760	94250	5	8820	94547	5	8880	94841	5	8940	95134	5	9000	95424	5	9060	95713	5	9120	95999	4

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9122	96009	5	9182	96294	4	9242	96577	4	9302	96858	4	9362	97137	5	9422	97414	5	9482	97690	5	9542	97964	4
9123	96014	5	9183	96298	5	9243	96581	5	9303	96862	5	9363	97142	4	9423	97419	5	9483	97695	4	9543	97968	5
9124	96019	4	9184	96303	5	9244	96586	5	9304	96867	5	9364	97146	5	9424	97424	4	9484	97699	5	9544	97973	5
9125	96023	5	9185	96308	5	9245	96591	4	9305	96872	4	9365	97151	4	9425	97428	5	9485	97704	4	9545	97978	4
9126	96028	5	9186	96313	4	9246	96595	5	9306	96876	5	9366	97155	5	9426	97433	4	9486	97708	5	9546	97982	5
9127	96033	5	9187	96317	5	9247	96600	5	9307	96881	5	9367	97160	5	9427	97437	5	9487	97713	4	9547	97987	4
9128	96038	4	9188	96322	5	9248	96605	4	9308	96886	4	9368	97165	4	9428	97442	5	9488	97717	5	9548	97991	5
9129	96042	5	9189	96327	5	9249	96609	5	9309	96890	5	9369	97169	5	9429	97447	4	9489	97722	5	9549	97996	4
9130	96047	5	9190	96332	4	9250	96614	5	9310	96895	5	9370	97174	5	9430	97451	5	9490	97727	4	9550	98000	5
9131	96052	5	9191	96336	5	9251	96619	5	9311	96900	4	9371	97179	4	9431	97456	4	9491	97731	5	9551	98005	4
9132	96057	4	9192	96341	5	9252	96624	4	9312	96904	5	9372	97183	5	9432	97460	5	9492	97736	4	9552	98009	5
9133	96061	5	9193	96346	4	9253	96628	5	9313	96909	5	9373	97188	4	9433	97465	5	9493	97740	5	9553	98014	5
9134	96066	5	9194	96350	5	9254	96633	5	9314	96914	4	9374	97192	5	9434	97470	4	9494	97745	4	9554	98019	4
9135	96071	5	9195	96355	5	9255	96638	4	9315	96918	5	9375	97197	5	9435	97474	5	9495	97749	5	9555	98023	5
9136	96076	4	9196	96360	5	9256	96642	5	9316	96923	5	9376	97202	4	9436	97479	4	9496	97754	5	9556	98028	4
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9142	96104	5	9202	96388	5	9262	96670	5	9322	96951	5	9382	97230	4	9442	97506	5	9502	97782	4	9562	98055	4
9143	96109	5	9203	96393	5	9263	96675	5	9323	96956	4	9383	97234	5	9443	97511	5	9503	97786	5	9563	98059	5
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9145	96118	5	9205	96402	5	9265	96685	4	9325	96965	5	9385	97243	5	9445	97520	5	9505	97795	5	9565	98068	5
9146	96123	5	9206	96407	5	9266	96689	5	9326	96970	4	9386	97248	5	9446	97525	4	9506	97800	4	9566	98073	5
9147	96128	5	9207	96412	5	9267	96694	5	9327	96974	5	9387	97253	4	9447	97529	5	9507	97804	5	9567	98078	4
9148	96133	4	9208	96417	4	9268	96699	4	9328	96979	5	9388	97257	5	9448	97534	5	9508	97809	4	9568	98082	5
9149	96137	5	9209	96421	5	9269	96703	5	9329	96984	4	9389	97262	5	9449	97539	4	9509	97813	5	9569	98087	4
9150	96142	5	9210	96426	5	9270	96708	5	9330	96988	5	9390	97267	4	9450	97543	5	9510	97818	5	9570	98091	5
9151	96147	5	9211	96431	4	9271	96713	4	9331	96993	4	9391	97271	5	9451	97548	4	9511	97823	4	9571	98096	4
9152	96152	4	9212	96435	5	9272	96717	5	9332	96997	5	9392	97276	4	9452	97552	5	9512	97827	5	9572	98100	5
9153	96156	5	9213	96440	5	9273	96722	5	9333	97002	5	9393	97280	5	9453	97557	5	9513	97832	4	9573	98105	4
9154	96161	5	9214	96445	5	9274	96727	4	9334	97007	4	9394	97285	5	9454	97562	4	9514	97836	5	9574	98109	5
9155	96166	5	9215	96450	4	9275	96731	5	9335	97011	5	9395	97290	4	9455	97566	5	9515	97841	4	9575	98114	4
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9157	96175	5	9217	96459	5	9277	96741	4	9337	97021	4	9397	97299	5	9457	97575	5	9517	97850	5	9577	98123	4
9158	96180	5	9218	96464	4	9278	96745	5	9338	97025	5	9398	97304	4	9458	97580	5	9518	97855	4	9578	98127	5
9159	96185	5	9219	96468	5	9279	96750	5	9339	97030	5	9399	97308	5	9459	97585	4	9519	97859	5	9579	98132	5
9160	96190	4	9220	96473	5	9280	96755	4	9340	97035	4	9400	97313	4	9460	97589	5	9520	97864	4	9580	98137	4
9161	96194	5	9221	96478	5	9281	96759	5	9341	97039	5	9401	97317	5	9461	97594	4	9521	97868	5	9581	98141	5
9162	96199	5	9222	96483	4	9282	96764	5	9342	97044	5	9402	97322	5	9462	97598	5	9522	97873	4	9582	98146	4
9163	96204	5	9223	96487	5	9283	96769	5	9343	97049	4	9403	97327	4	9463	97603	4	9523	97877	5	9583	98150	5
9164	96209	4	9224	96492	5	9284	96774	4	9344	97053	5	9404	97331	5	9464	97607	5	9524	97882	4	9584	98155	4
9165	96213	5	9225	96497	4	9285	96778	5	9345	97058	5	9405	97336	4	9465	97612	5	9525	97886	5	9585	98159	5
9166	96218	5	9226	96501	5	9286	96783	5	9346	97063	4	9406	97340	5	9466	97617	4	9526	97891	5	9586	98164	4
9167	96223	4	9227	96506	5	9287	96788	4	9347	97067	5	9407	97345	5	9467	97621	5	9527	97896	4	9587	98168	5
9168	96227	5	9228	96511	4	9288	96792	5	9348	97072	5	9408	97350	4	9468	97626	4	9528	97900	5	9588	98173	4
9169	96232	5	9229	96515	5	9289	96797	5	9349	97077	4	9409	97354	5	9469	97630	5	9529	97905	4	9589	98177	5
9170	96237	5	9230	96520	5	9290	96802	4	9350	97081	5	9410	97359	5	9470	97635	5	9530	97909	5	9590	98182	4
9171	96242	4	9231	96525	5	9291	96806	5	9351	97086	4	9411	97364	4	9471	97640	4	9531	97914	4	9591	98186	5
9172	96246	5	9232	96530	4	9292	96811	5	9352	97090	5	9412	97368	5	9472	97644	5	9532	97918	5	9592	98191	4
9173	96251	5	9233	96534	5	9293	96816	4	9353	97095	5	9413	97373	4	9473	97649	4	9533	97923	5	9593	98195	5
9174	96256	5	9234	96539	5	9294	96820	5	9354	97100	4	9414	97377	5	9474	97653	5	9534	97928	4	9594	98200	4
9175	96261	4	9235	96544	4	9295	96825	5	9355	97104	5	9415	97382	5	9475	97658	5	9535	97932	5	9595	98204	5
9176	96265	5	9236	96548	5	9296	96830	4	9356	97109	5	9416	97387	4	9476	97663	4	9536	97937	4	9596	98209	5
9177	96270	5	9237	96553	5	9297	96834	5	9357	97114	4	9417	97391	5	9477	97667	5	9537	97941	5	9597	98214	4
9178	96275	5	9238	96558	4	9298	96839	5	9358	97118	5	9418	97396	4	9478	97672	4	9538	97946	4	9598	98218	5
9179	96280	4	9239	96562	5	9299	96844	4	9359	97123	5	9419	97400	5	9479	97676	5	9539	97950	5	9599	98223	4
9180	96284		9240	96567		9300	96848		9360	97128		9420	97405		9480	97681		9540	97955		9600	98227	

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9601	98232	4	9651	98457	5	9701	98682	4	9751	98905	4	9801	99127	4	9851	99348	4	9901	99568	4	9951	99787	4
9602	98236	5	9652	98462	4	9702	98686	5	9752	98909	5	9802	99131	5	9852	99352	5	9902	99572	5	9952	99791	4
9603	98241	4	9653	98466	5	9703	98691	4	9753	98914	4	9803	99136	4	9853	99357	4	9903	99577	4	9953	99795	5
9604	98245	5	9654	98471	4	9704	98695	5	9754	98918	5	9804	99140	5	9854	99361	5	9904	99581	4	9954	99800	4
9605	98250	4	9655	98475	5	9705	98700	4	9755	98923	4	9805	99145	4	9855	99366	4	9905	99585	5	9955	99804	4
9606	98254	5	9656	98480	4	9706	98704	5	9756	98927	5	9806	99149	5	9856	99370	4	9906	99590	4	9956	99808	5
9607	98259	4	9657	98484	5	9707	98709	4	9757	98932	4	9807	99154	4	9857	99374	5	9907	99594	5	9957	99813	4
9608	98263	5	9658	98489	4	9708	98713	4	9758	98936	5	9808	99158	4	9858	99379	4	9908	99599	4	9958	99817	5
9609	98268	4	9659	98493	5	9709	98717	5	9759	98941	4	9809	99162	5	9859	99383	5	9909	99603	4	9959	99822	4
9610	98272	5	9660	98498	4	9710	98722	4	9760	98945	4	9810	99167	4	9860	99388	4	9910	99607	5	9960	99826	4
9611	98277	4	9661	98502	5	9711	98726	5	9761	98949	5	9811	99171	5	9861	99392	4	9911	99612	4	9961	99830	5
9612	98281	5	9662	98507	4	9712	98731	4	9762	98954	4	9812	99176	4	9862	99396	5	9912	99616	5	9962	99835	4
9613	98286	4	9663	98511	5	9713	98735	5	9763	98958	5	9813	99180	5	9863	99401	4	9913	99621	4	9963	99839	4
9614	98290	5	9664	98516	4	9714	98740	4	9764	98963	4	9814	99185	4	9864	99405	5	9914	99625	4	9964	99843	5
9615	98295	4	9665	98520	5	9715	98744	5	9765	98967	5	9815	99189	4	9865	99410	4	9915	99629	5	9965	99848	4
9616	98299	5	9666	98525	4	9716	98749	4	9766	98972	4	9816	99193	5	9866	99414	5	9916	99634	4	9966	99852	4
9617	98304	4	9667	98529	5	9717	98753	5	9767	98976	5	9817	99198	4	9867	99419	4	9917	99638	4	9967	99856	5
9618	98308	5	9668	98534	4	9718	98758	4	9768	98981	4	9818	99202	5	9868	99423	4	9918	99642	5	9968	99861	4
9619	98313	5	9669	98538	5	9719	98762	5	9769	98985	4	9819	99207	4	9869	99427	5	9919	99647	4	9969	99865	5
9620	98318	4	9670	98543	4	9720	98767	4	9770	98989	5	9820	99211	5	9870	99432	4	9920	99651	5	9970	99870	4
9621	98322	5	9671	98547	5	9721	98771	5	9771	98994	4	9821	99216	4	9871	99436	5	9921	99656	4	9971	99874	4
9622	98327	4	9672	98552	4	9722	98776	4	9772	98998	5	9822	99220	4	9872	99441	4	9922	99660	4	9972	99878	5
9623	98331	5	9673	98556	5	9723	98780	4	9773	99003	4	9823	99224	5	9873	99445	4	9923	99664	5	9973	99883	4
9624	98336	4	9674	98561	4	9724	98784	5	9774	99007	5	9824	99229	4	9874	99449	5	9924	99669	4	9974	99887	4
9625	98340	5	9675	98565	5	9725	98789	4	9775	99012	4	9825	99233	5	9875	99454	4	9925	99673	4	9975	99891	5
9626	98345	4	9676	98570	4	9726	98793	5	9776	99016	5	9826	99238	4	9876	99458	5	9926	99677	5	9976	99896	4
9627	98349	5	9677	98574	5	9727	98798	4	9777	99021	4	9827	99242	5	9877	99463	4	9927	99682	4	9977	99900	4
9628	98354	4	9678	98579	4	9728	98802	5	9778	99025	4	9828	99247	4	9878	99467	4	9928	99686	5	9978	99904	5
9629	98358	5	9679	98583	5	9729	98807	4	9779	99029	5	9829	99251	4	9879	99471	5	9929	99691	4	9979	99909	4
9630	98363	4	9680	98588	4	9730	98811	5	9780	99034	4	9830	99255	5	9880	99476	4	9930	99695	4	9980	99913	4
9631	98367	5	9681	98592	5	9731	98816	4	9781	99038	5	9831	99260	4	9881	99480	4	9931	99699	5	9981	99917	5
9632	98372	4	9682	98597	4	9732	98820	5	9782	99043	4	9832	99264	5	9882	99484	5	9932	99704	4	9982	99922	4
9633	98376	5	9683	98601	4	9733	98825	4	9783	99047	5	9833	99269	4	9883	99489	4	9933	99708	4	9983	99926	4
9634	98381	4	9684	98605	5	9734	98829	5	9784	99052	4	9834	99273	4	9884	99493	5	9934	99712	5	9984	99930	5
9635	98385	5	9685	98610	4	9735	98834	4	9785	99056	5	9835	99277	5	9885	99498	4	9935	99717	4	9985	99935	4
9636	98390	4	9686	98614	5	9736	98838	5	9786	99061	4	9836	99282	4	9886	99502	4	9936	99721	5	9986	99939	5
9637	98394	5	9687	98619	4	9737	98843	4	9787	99065	4	9837	99286	5	9887	99506	5	9937	99726	4	9987	99944	4
9638	98399	4	9688	98623	5	9738	98847	4	9788	99069	5	9838	99291	4	9888	99511	4	9938	99730	4	9988	99948	4
9639	98403	5	9689	98628	4	9739	98851	5	9789	99074	4	9839	99295	5	9889	99515	5	9939	99734	5	9989	99952	5
9640	98408	4	9690	98632	5	9740	98856	4	9790	99078	5	9840	99300	4	9890	99520	4	9940	99739	4	9990	99957	4
9641	98412	5	9691	98637	4	9741	98860	5	9791	99083	4	9841	99304	4	9891	99524	4	9941	99743	4	9991	99961	4
9642	98417	4	9692	98641	5	9742	98865	4	9792	99087	5	9842	99308	5	9892	99528	5	9942	99747	5	9992	99965	5
9643	98421	5	9693	98646	4	9743	98869	5	9793	99092	4	9843	99313	4	9893	99533	4	9943	99752	4	9993	99970	4
9644	98426	4	9694	98650	5	9744	98874	4	9794	99096	4	9844	99317	5	9894	99537	5	9944	99756	4	9994	99974	4
9645	98430	5	9695	98655	4	9745	98878	5	9795	99100	5	9845	99322	4	9895	99542	4	9945	99760	5	9995	99978	5
9646	98435	4	9696	98659	5	9746	98883	4	9796	99105	4	9846	99326	4	9896	99546	4	9946	99765	4	9996	99983	4
9647	98439	5	9697	98664	4	9747	98887	5	9797	99109	5	9847	99330	5	9897	99550	5	9947	99769	5	9997	99987	4
9648	98444	4	9698	98668	5	9748	98892	4	9798	99114	4	9848	99335	4	9898	99555	4	9948	99774	4	9998	99991	5
9649	98448	5	9699	98673	4	9749	98896	4	9799	99118	5	9849	99339	5	9899	99559	5	9949	99778	4	9999	99996	4
9650	98453		9700	98677		9750	98900		9800	99123		9850	99344		9900	99564		9950	99782		10000	00000	

0 Degrees.

′	Sin.	Dif.	Tang.	Dif.	Cot.	Coſ.	′
0	Inf. neg.		Inf. neg.		Inf. pos.	0.00000	60
1	6.46373		6.46373		13.53627	0.00000	59
2	6.76476	30103	6.76476	30103	13.23524	0.00000	58
3	6.94085	17609	6.94085	17609	13.05915	0.00000	57
4	7.06579	12494	7.06579	12494	12.93421	0.00000	56
5	7.16270	9691	7.16270	9691	12.83730	0.00000	55
6	7.24188	7918	7.24188	7918	12.75812	0.00000	54
7	7.30882	6694	7.30882	6694	12.69118	0.00000	53
8	7.36682	5800	7.36682	5800	12.63318	0.00000	52
9	7.41797	5115	7.41797	5115	12.58203	0.00000	51
10	7.46373	4576	7.46373	4576	12.53627	0.00000	50
11	7.50512	4139	7.50512	4139	12.49488	0.00000	49
12	7.54291	3779	7.54291	3779	12.45709	0.00000	48
13	7.57767	3476	7.57767	3476	12.42233	0.00000	47
14	7.60985	3218	7.60986	3219	12.39014	0.00000	46
15	7.63982	2997	7.63982	2996	12.36018	0.00000	45
16	7.66784	2802	7.66785	2803	12.33215	0.00000	44
17	7.69417	2633	7.69418	2633	12.30582	9.99999	43
18	7.71900	2483	7.71900	2482	12.28100	9.99999	42
19	7.74248	2348	7.74248	2348	12.25752	9.99999	41
20	7.76475	2227	7.76476	2228	12.23524	9.99999	40
21	7.78594	2119	7.78595	2119	12.21405	9.99999	39
22	7.80615	2021	7.80615	2020	12.19385	9.99999	38
23	7.82545	1930	7.82546	1931	12.17454	9.99999	37
24	7.84393	1848	7.84394	1848	12.15606	9.99999	36
25	7.86166	1773	7.86167	1773	12.13833	9.99999	35
26	7.87870	1704	7.87871	1704	12.12129	9.99999	34
27	7.89509	1639	7.89510	1639	12.10490	9.99999	33
28	7.91088	1579	7.91089	1579	12.08911	9.99999	32
29	7.92612	1524	7.92613	1524	12.07387	9.99998	31
30	7.94084	1472	7.94086	1473	12.05914	9.99998	30
31	7.95508	1424	7.95510	1424	12.04490	9.99998	29
32	7.96887	1379	7.96889	1379	12.03111	9.99998	28
33	7.98223	1336	7.98225	1336	12.01775	9.99998	27
34	7.99520	1297	7.99522	1297	12.00478	9.99998	26
35	8.00779	1259	8.00781	1259	11.99219	9.99998	25
36	8.02002	1223	8.02004	1223	11.97996	9.99998	24
37	8.03192	1190	8.03194	1190	11.96806	9.99997	23
38	8.04350	1158	8.04353	1159	11.95647	9.99997	22
39	8.05478	1128	8.05481	1128	11.94519	9.99997	21
40	8.06578	1100	8.06581	1100	11.93419	9.99997	20
41	8.07650	1072	8.07653	1072	11.92347	9.99997	19
42	8.08696	1046	8.08700	1047	11.91300	9.99997	18
43	8.09718	1022	8.09722	1022	11.90278	9.99997	17
44	8.10717	999	8.10720	998	11.89280	9.99996	16
45	8.11693	976	8.11696	976	11.88304	9.99996	15
46	8.12647	954	8.12651	955	11.87349	9.99996	14
47	8.13581	934	8.13585	934	11.86415	9.99996	13
48	8.14495	914	8.14500	915	11.85500	9.99996	12
49	8.15391	896	8.15395	895	11.84605	9.99996	11
50	8.16268	877	8.16273	878	11.83727	9.99995	10
51	8.17128	860	8.17133	860	11.82867	9.99995	9
52	8.17971	843	8.17976	843	11.82024	9.99995	8
53	8.18798	827	8.18804	828	11.81196	9.99995	7
54	8.19610	812	8.19616	812	11.80384	9.99995	6
55	8.20407	797	8.20413	797	11.79587	9.99994	5
56	8.21189	782	8.21195	782	11.78805	9.99994	4
57	8.21958	769	8.21964	769	11.78036	9.99994	3
58	8.22713	755	8.22720	756	11.77280	9.99994	2
59	8.23456	743	8.23462	742	11.76538	9.99994	1
60	8.24186	730	8.24192	730	11.75808	9.99993	0
	Coſ.		Cot.		Tang.	Sin.	

89 Degrees.

1 Degree.

′	Sin.	Dif.	Tang.	Dif.	Cot.	Coſ.	′
0	8.24186		8.24192		11.75808	9.99993	60
1	8.24903	717	8.24910	718	11.75090	9.99993	59
2	8.25609	706	8.25616	706	11.74384	9.99993	58
3	8.26304	695	8.26312	696	11.73688	9.99993	57
4	8.26988	684	8.26996	684	11.73004	9.99992	56
5	8.27661	673	8.27669	673	11.72331	9.99992	55
6	8.28324	663	8.28332	663	11.71668	9.99992	54
7	8.28977	653	8.28986	654	11.71014	9.99992	53
8	8.29621	644	8.29629	643	11.70371	9.99992	52
9	8.30255	634	8.30263	634	11.69737	9.99991	51
10	8.30879	624	8.30888	625	11.69112	9.99991	50
11	8.31495	616	8.31505	617	11.68495	9.99991	49
12	8.32103	608	8.32112	607	11.67888	9.99990	48
13	8.32702	599	8.32711	599	11.67289	9.99990	47
14	8.33292	590	8.33302	591	11.66698	9.99990	46
15	8.33875	583	8.33886	584	11.66114	9.99990	45
16	8.34450	575	8.34461	575	11.65539	9.99989	44
17	8.35018	568	8.35029	568	11.64971	9.99989	43
18	8.35578	560	8.35590	561	11.64410	9.99989	42
19	8.36131	553	8.36143	553	11.63857	9.99989	41
20	8.36678	547	8.36689	546	11.63311	9.99988	40
21	8.37217	539	8.37229	540	11.62771	9.99988	39
22	8.37750	533	8.37762	533	11.62238	9.99988	38
23	8.38276	526	8.38289	527	11.61711	9.99987	37
24	8.38796	520	8.38809	520	11.61191	9.99987	36
25	8.39310	514	8.39323	514	11.60677	9.99987	35
26	8.39818	508	8.39832	509	11.60168	9.99986	34
27	8.40320	502	8.40334	502	11.59666	9.99986	33
28	8.40816	496	8.40830	496	11.59170	9.99986	32
29	8.41307	491	8.41321	491	11.58679	9.99985	31
30	8.41792	485	8.41807	486	11.58193	9.99985	30
31	8.42272	480	8.42287	480	11.57713	9.99985	29
32	8.42746	474	8.42762	475	11.57238	9.99984	28
33	8.43216	470	8.43232	470	11.56768	9.99984	27
34	8.43680	464	8.43696	464	11.56304	9.99984	26
35	8.44139	459	8.44156	460	11.55844	9.99983	25
36	8.44594	455	8.44611	455	11.55389	9.99983	24
37	8.45044	450	8.45061	450	11.54939	9.99983	23
38	8.45489	445	8.45507	446	11.54493	9.99982	22
39	8.45930	441	8.45948	441	11.54052	9.99982	21
40	8.46366	436	8.46385	437	11.53615	9.99982	20
41	8.46799	433	8.46817	432	11.53183	9.99981	19
42	8.47226	427	8.47245	428	11.52755	9.99981	18
43	8.47650	424	8.47669	424	11.52331	9.99981	17
44	8.48069	419	8.48089	420	11.51911	9.99980	16
45	8.48485	416	8.48505	416	11.51495	9.99980	15
46	8.48896	411	8.48917	412	11.51083	9.99979	14
47	8.49304	408	8.49325	408	11.50675	9.99979	13
48	8.49708	404	8.49729	404	11.50271	9.99979	12
49	8.50108	400	8.50130	401	11.49870	9.99978	11
50	8.50504	396	8.50527	397	11.49473	9.99978	10
51	8.50897	393	8.50920	393	11.49080	9.99977	9
52	8.51287	390	8.51310	390	11.48690	9.99977	8
53	8.51673	386	8.51696	386	11.48304	9.99977	7
54	8.52055	382	8.52079	383	11.47921	9.99976	6
55	8.52434	379	8.52459	380	11.47541	9.99976	5
56	8.52810	376	8.52835	376	11.47165	9.99975	4
57	8.53183	373	8.53208	373	11.46792	9.99975	3
58	8.53552	369	8.53578	370	11.46422	9.99974	2
59	8.53919	367	8.53945	367	11.46055	9.99974	1
60	8.54282	363	8.54308	363	11.45692	9.99974	0
	Coſ.		Cot.		Tang.	Sin.	

88 Degrees.

2 Degrees.

′	Sin.	Dif.	Tang.	Dif.	Cot.	Cos.	′
0	8.54282		8.54308		11.45692	9.99974	60
1	8.54642	360	8.54669	361	11.45331	9.99973	59
2	8.54999	357	8.55027	358	11.44973	9.99973	58
3	8.55354	355	8.55382	355	11.44618	9.99972	57
4	8.55705	351	8.55734	352	11.44266	9.99972	56
5	8.56054	349	8.56083	349	11.43917	9.99971	55
6	8.56400	346	8.56429	346	11.43571	9.99971	54
7	8.56743	343	8.56773	344	11.43227	9.99970	53
8	8.57084	341	8.57114	341	11.42886	9.99970	52
9	8.57421	337	8.57452	338	11.42548	9.99969	51
10	8.57757	336	8.57788	336	11.42212	9.99969	50
11	8.58089	332	8.58121	333	11.41879	9.99968	49
12	8.58419	330	8.58451	330	11.41549	9.99968	48
13	8.58747	328	8.58779	328	11.41221	9.99967	47
14	8.59072	325	8.59105	326	11.40895	9.99967	46
15	8.59395	323	8.59428	323	11.40572	9.99967	45
16	8.59715	320	8.59749	321	11.40251	9.99966	44
17	8.60033	318	8.60068	319	11.39932	9.99966	43
18	8.60349	316	8.60384	316	11.39616	9.99965	42
19	8.60662	313	8.60698	314	11.39302	9.99964	41
20	8.60973	311	8.61009	311	11.38991	9.99964	40
21	8.61282	309	8.61319	310	11.38681	9.99963	39
22	8.61589	307	8.61626	307	11.38374	9.99963	38
23	8.61894	305	8.61931	305	11.38069	9.99962	37
24	8.62196	302	8.62234	303	11.37766	9.99962	36
25	8.62497	301	8.62535	301	11.37465	9.99961	35
26	8.62795	298	8.62834	299	11.37166	9.99961	34
27	8.63091	296	8.63131	297	11.36869	9.99960	33
28	8.63385	294	8.63426	295	11.36574	9.99960	32
29	8.63678	293	8.63718	292	11.36282	9.99959	31
30	8.63968	290	8.64009	291	11.35991	9.99959	30
31	8.64256	288	8.64298	289	11.35702	9.99958	29
32	8.64543	287	8.64585	287	11.35415	9.99958	28
33	8.64827	284	8.64870	285	11.35130	9.99957	27
34	8.65110	283	8.65154	284	11.34846	9.99956	26
35	8.65391	281	8.65435	281	11.34565	9.99956	25
36	8.65670	279	8.65715	280	11.34285	9.99955	24
37	8.65947	277	8.65993	278	11.34007	9.99955	23
38	8.66223	276	8.66269	276	11.33731	9.99954	22
39	8.66497	274	8.66543	274	11.33457	9.99954	21
40	8.66769	272	8.66816	273	11.33184	9.99953	20
41	8.67039	270	8.67087	271	11.32913	9.99952	19
42	8.67308	269	8.67356	269	11.32644	9.99952	18
43	8.67575	267	8.67624	268	11.32376	9.99951	17
44	8.67841	266	8.67890	266	11.32110	9.99951	16
45	8.68104	263	8.68154	264	11.31846	9.99950	15
46	8.68367	263	8.68417	263	11.31583	9.99949	14
47	8.68627	260	8.68678	261	11.31322	9.99949	13
48	8.68886	259	8.68938	260	11.31062	9.99948	12
49	8.69144	258	8.69196	258	11.30804	9.99948	11
50	8.69400	256	8.69453	257	11.30547	9.99947	10
51	8.69654	254	8.69708	255	11.30292	9.99946	9
52	8.69907	253	8.69962	254	11.30038	9.99946	8
53	8.70159	252	8.70214	252	11.29786	9.99945	7
54	8.70409	250	8.70465	251	11.29535	9.99944	6
55	8.70658	249	8.70714	249	11.29286	9.99944	5
56	8.70905	247	8.70962	248	11.29038	9.99943	4
57	8.71151	246	8.71208	246	11.28792	9.99942	3
58	8.71395	244	8.71453	245	11.28547	9.99942	2
59	8.71638	243	8.71697	244	11.28303	9.99941	1
60	8.71880	242	8.71940	243	11.28060	9.99940	0
	Cos.		Cot.		Tang.	Sin.	

87 Degrees.

3 Degrees.

′	Sin.	Dif.	Tang.	Dif.	Cot.	Cos.	′
0	8.71880		8.71940		11.28060	9.99940	60
1	8.72120	240	8.72181	241	11.27819	9.99940	59
2	8.72359	239	8.72420	239	11.27580	9.99939	58
3	8.72597	238	8.72659	239	11.27341	9.99938	57
4	8.72834	237	8.72896	237	11.27104	9.99938	56
5	8.73069	235	8.73132	236	11.26868	9.99937	55
6	8.73303	234	8.73366	234	11.26634	9.99936	54
7	8.73535	232	8.73600	234	11.26400	9.99936	53
8	8.73767	232	8.73832	232	11.26168	9.99935	52
9	8.73997	230	8.74063	231	11.25937	9.99934	51
10	8.74226	229	8.74292	229	11.25708	9.99934	50
11	8.74454	228	8.74521	229	11.25479	9.99933	49
12	8.74680	226	8.74748	227	11.25252	9.99932	48
13	8.74906	226	8.74974	226	11.25026	9.99932	47
14	8.75130	224	8.75199	225	11.24801	9.99931	46
15	8.75353	223	8.75423	224	11.24577	9.99930	45
16	8.75575	222	8.75645	222	11.24355	9.99929	44
17	8.75795	220	8.75867	222	11.24133	9.99929	43
18	8.76015	220	8.76087	220	11.23913	9.99928	42
19	8.76234	219	8.76306	219	11.23694	9.99927	41
20	8.76451	217	8.76525	219	11.23475	9.99926	40
21	8.76667	216	8.76742	217	11.23258	9.99926	39
22	8.76883	216	8.76958	216	11.23042	9.99925	38
23	8.77097	214	8.77173	215	11.22827	9.99924	37
24	8.77310	213	8.77387	214	11.22613	9.99923	36
25	8.77522	212	8.77600	213	11.22400	9.99923	35
26	8.77733	211	8.77811	211	11.22189	9.99922	34
27	8.77943	210	8.78022	211	11.21978	9.99921	33
28	8.78152	209	8.78232	210	11.21768	9.99920	32
29	8.78360	208	8.78441	209	11.21559	9.99920	31
30	8.78568	208	8.78649	208	11.21351	9.99919	30
31	8.78774	206	8.78855	206	11.21145	9.99918	29
32	8.78979	205	8.79061	206	11.20939	9.99917	28
33	8.79183	204	8.79266	205	11.20734	9.99917	27
34	8.79386	203	8.79470	204	11.20530	9.99916	26
35	8.79588	202	8.79673	203	11.20327	9.99915	25
36	8.79789	201	8.79875	202	11.20125	9.99914	24
37	8.79990	201	8.80076	201	11.19924	9.99913	23
38	8.80189	199	8.80277	201	11.19723	9.99913	22
39	8.80388	199	8.80476	199	11.19524	9.99912	21
40	8.80585	197	8.80674	198	11.19326	9.99911	20
41	8.80782	197	8.80872	198	11.19128	9.99910	19
42	8.80978	196	8.81068	196	11.18932	9.99909	18
43	8.81173	195	8.81264	196	11.18736	9.99909	17
44	8.81367	194	8.81459	195	11.18541	9.99908	16
45	8.81560	193	8.81653	194	11.18347	9.99907	15
46	8.81752	192	8.81846	193	11.18154	9.99906	14
47	8.81944	192	8.82038	192	11.17962	9.99905	13
48	8.82134	190	8.82230	192	11.17770	9.99904	12
49	8.82324	190	8.82420	190	11.17580	9.99904	11
50	8.82513	189	8.82610	190	11.17390	9.99903	10
51	8.82701	188	8.82799	189	11.17201	9.99902	9
52	8.82888	187	8.82987	188	11.17013	9.99901	8
53	8.83075	187	8.83175	188	11.16825	9.99900	7
54	8.83261	186	8.83361	186	11.16639	9.99899	6
55	8.83446	185	8.83547	186	11.16453	9.99898	5
56	8.83630	184	8.83732	185	11.16268	9.99898	4
57	8.83813	183	8.83916	184	11.16084	9.99897	3
58	8.83996	183	8.84100	184	11.15900	9.99896	2
59	8.84177	181	8.84282	182	11.15718	9.99895	1
60	8.84358	181	8.84464	182	11.15536	9.99894	0
	Cos.		Cot.		Tang.	Sin.	

86 Degrees.

4 Degrees.

′	Sin.	Dif.	Tang.	Dif.	Cot.	Cof.	′
0	8.84358	181	8.84464	182	11.15536	9.99894	60
1	8.84539	179	8.84646	180	11.15354	9.99893	59
2	8.84718	179	8.84826	180	11.15174	9.99892	58
3	8.84897	178	8.85006	179	11.14994	9.99891	57
4	8.85075	177	8.85185	178	11.14815	9.99891	56
5	8.85252	177	8.85363	177	11.14637	9.99890	55
6	8.85429	176	8.85540	177	11.14460	9.99889	54
7	8.85605	175	8.85717	176	11.14283	9.99888	53
8	8.85780	175	8.85893	176	11.14107	9.99887	52
9	8.85955	173	8.86069	174	11.13931	9.99886	51
10	8.86128	173	8.86243	174	11.13757	9.99885	50
11	8.86301	173	8.86417	174	11.13583	9.99884	49
12	8.86474	171	8.86591	172	11.13409	9.99883	48
13	8.86645	171	8.86763	172	11.13237	9.99882	47
14	8.86816	171	8.86935	171	11.13065	9.99881	46
15	8.86987	169	8.87106	171	11.12894	9.99880	45
16	8.87156	169	8.87277	170	11.12723	9.99879	44
17	8.87325	169	8.87447	169	11.12553	9.99879	43
18	8.87494	167	8.87616	169	11.12384	9.99878	42
19	8.87661	168	8.87785	168	11.12215	9.99877	41
20	8.87829	166	8.87953	167	11.12047	9.99876	40
21	8.87995	166	8.88120	167	11.11880	9.99875	39
22	8.88161	165	8.88287	166	11.11713	9.99874	38
23	8.88326	164	8.88453	165	11.11547	9.99873	37
24	8.88490	164	8.88618	165	11.11382	9.99872	36
25	8.88654	163	8.88783	165	11.11217	9.99871	35
26	8.88817	163	8.88948	163	11.11052	9.99870	34
27	8.88980	162	8.89111	163	11.10889	9.99869	33
28	8.89142	162	8.89274	163	11.10726	9.99868	32
29	8.89304	160	8.89437	161	11.10563	9.99867	31
30	8.89464	161	8.89598	162	11.10402	9.99866	30
31	8.89625	159	8.89760	160	11.10240	9.99865	29
32	8.89784	159	8.89920	160	11.10080	9.99864	28
33	8.89943	159	8.90080	160	11.09920	9.99863	27
34	8.90102	158	8.90240	159	11.09760	9.99862	26
35	8.90260	157	8.90399	158	11.09601	9.99861	25
36	8.90417	157	8.90557	158	11.09443	9.99860	24
37	8.90574	156	8.90715	157	11.09285	9.99859	23
38	8.90730	155	8.90872	157	11.09128	9.99858	22
39	8.90885	155	8.91029	156	11.08971	9.99857	21
40	8.91040	155	8.91185	155	11.08815	9.99856	20
41	8.91195	154	8.91340	155	11.08660	9.99855	19
42	8.91349	153	8.91495	155	11.08505	9.99854	18
43	8.91502	153	8.91650	153	11.08350	9.99853	17
44	8.91655	152	8.91803	154	11.08197	9.99852	16
45	8.91807	152	8.91957	153	11.08043	9.99851	15
46	8.91959	151	8.92110	152	11.07890	9.99850	14
47	8.92110	151	8.92262	152	11.07738	9.99848	13
48	8.92261	150	8.92414	151	11.07586	9.99847	12
49	8.92411	150	8.92565	151	11.07435	9.99846	11
50	8.92561	149	8.92716	150	11.07284	9.99845	10
51	8.92710	149	8.92866	150	11.07134	9.99844	9
52	8.92859	148	8.93016	149	11.06984	9.99843	8
53	8.93007	147	8.93165	148	11.06835	9.99842	7
54	8.93154	147	8.93313	149	11.06687	9.99841	6
55	8.93301	147	8.93462	147	11.06538	9.99840	5
56	8.93448	146	8.93609	147	11.06391	9.99839	4
57	8.93594	146	8.93756	147	11.06244	9.99838	3
58	8.93740	145	8.93903	146	11.06097	9.99837	2
59	8.93885	145	8.94049	146	11.05951	9.99836	1
60	8.94030		8.94195		11.05805	9.99834	0
	Cof.		Cot.		Tang.	Sin.	

85 Degrees.

5 Degrees.

′	Sin.	Dif.	Tang.	Dif.	Cot.	Cof.	′
0	8.94030	144	8.94195	145	11.05805	9.99834	60
1	8.94174	143	8.94340	145	11.05660	9.99833	59
2	8.94317	144	8.94485	145	11.05515	9.99832	58
3	8.94461	142	8.94630	143	11.05370	9.99831	57
4	8.94603	143	8.94773	144	11.05227	9.99830	56
5	8.94746	141	8.94917	143	11.05083	9.99829	55
6	8.94887	142	8.95060	142	11.04940	9.99828	54
7	8.95029	141	8.95202	142	11.04798	9.99827	53
8	8.95170	140	8.95344	142	11.04656	9.99825	52
9	8.95310	140	8.95486	141	11.04514	9.99824	51
10	8.95450	139	8.95627	140	11.04373	9.99823	50
11	8.95589	139	8.95767	141	11.04233	9.99822	49
12	8.95728	139	8.95908	139	11.04092	9.99821	48
13	8.95867	138	8.96047	140	11.03953	9.99820	47
14	8.96005	138	8.96187	138	11.03813	9.99819	46
15	8.96143	137	8.96325	139	11.03675	9.99817	45
16	8.96280	137	8.96464	138	11.03536	9.99816	44
17	8.96417	136	8.96602	137	11.03398	9.99815	43
18	8.96553	136	8.96739	138	11.03261	9.99814	42
19	8.96689	136	8.96877	136	11.03123	9.99813	41
20	8.96825	135	8.97013	137	11.02987	9.99812	40
21	8.96960	135	8.97150	135	11.02850	9.99810	39
22	8.97095	134	8.97285	136	11.02715	9.99809	38
23	8.97229	134	8.97421	135	11.02579	9.99808	37
24	8.97363	133	8.97556	135	11.02444	9.99807	36
25	8.97496	133	8.97691	134	11.02309	9.99806	35
26	8.97629	133	8.97825	134	11.02175	9.99804	34
27	8.97762	132	8.97959	133	11.02041	9.99803	33
28	8.97894	132	8.98092	133	11.01908	9.99802	32
29	8.98026	131	8.98225	133	11.01775	9.99801	31
30	8.98157	131	8.98358	132	11.01642	9.99800	30
31	8.98288	131	8.98490	132	11.01510	9.99798	29
32	8.98419	130	8.98622	131	11.01378	9.99797	28
33	8.98549	130	8.98753	131	11.01247	9.99796	27
34	8.98679	129	8.98884	131	11.01116	9.99795	26
35	8.98808	129	8.99015	130	11.00985	9.99793	25
36	8.98937	129	8.99145	130	11.00855	9.99792	24
37	8.99066	128	8.99275	130	11.00725	9.99791	23
38	8.99194	128	8.99405	129	11.00595	9.99790	22
39	8.99322	128	8.99534	128	11.00466	9.99788	21
40	8.99450	127	8.99662	129	11.00338	9.99787	20
41	8.99577	127	8.99791	128	11.00209	9.99786	19
42	8.99704	126	8.99919	127	11.00081	9.99785	18
43	8.99830	126	9.00046	128	10.99954	9.99783	17
44	8.99956	126	9.00174	127	10.99826	9.99782	16
45	9.00082	125	9.00301	126	10.99699	9.99781	15
46	9.00207	125	9.00427	126	10.99573	9.99780	14
47	9.00332	124	9.00553	126	10.99447	9.99778	13
48	9.00456	125	9.00679	126	10.99321	9.99777	12
49	9.00581	123	9.00805	125	10.99195	9.99776	11
50	9.00704	124	9.00930	125	10.99070	9.99775	10
51	9.00828	123	9.01055	124	10.98945	9.99773	9
52	9.00951	123	9.01179	124	10.98821	9.99772	8
53	9.01074	122	9.01303	124	10.98697	9.99771	7
54	9.01196	122	9.01427	123	10.98573	9.99769	6
55	9.01318	122	9.01550	123	10.98450	9.99768	5
56	9.01440	121	9.01673	123	10.98327	9.99767	4
57	9.01561	121	9.01796	122	10.98204	9.99765	3
58	9.01682	121	9.01918	122	10.98082	9.99764	2
59	9.01803	120	9.02040	122	10.97960	9.99763	1
60	9.01923		9.02162		10.97838	9.99761	0
	Cof.		Cot.		Tang.	Sin.	

84 Degrees.

6 Degrees.

'	Sin.	Dif.	Tang.	Dif.	Cot.	Cof.	'
0	9.01923	120	9.02162	121	10.97838	9.99761	60
1	9.02043	120	9.02283	121	10.97717	9.99760	59
2	9.02163	120	9.02404	121	10.97596	9.99759	58
3	9.02283	119	9.02525	120	10.97475	9.99757	57
4	9.02402	118	9.02645	121	10.97355	9.99756	56
5	9.01520	119	9.02766	119	10.97234	9.99755	55
6	9.02639	118	9.02885	120	10.97115	9.99753	54
7	9.02757	117	9.03005	119	10.96995	9.99752	53
8	9.02874	118	9.03124	118	10.96876	9.99751	52
9	9.02992	117	9.03242	119	10.96758	9.99749	51
10	9.03109	117	9.03361	118	10.96639	9.99748	50
11	9.03226	116	9.03479	118	10.96521	9.99747	49
12	9.03342	116	9.03597	117	10.96403	9.99745	48
13	9.03458	116	9.03714	118	10.96286	9.99744	47
14	9.03574	116	9.03832	116	10.96168	9.99742	46
15	9.03690	115	9.03948	117	10.96052	9.99741	45
16	9.03805	115	9.04065	116	10.95935	9.99740	44
17	9.03920	114	9.04181	116	10.95819	9.99738	43
18	9.04034	115	9.04297	116	10.95703	9.99737	42
19	9.04149	113	9.04413	115	10.95587	9.99736	41
20	9.04262	114	9.04528	115	10.95472	9.99734	40
21	9.04376	114	9.04643	115	10.95357	9.99733	39
22	9.04490	113	9.04758	115	10.95242	9.99731	38
23	9.04603	112	9.04873	114	10.95127	9.99730	37
24	9.04715	113	9.04987	114	10.95013	9.99728	36
25	9.04828	112	9.05101	113	10.94899	9.99727	35
26	9.04940	112	9.05214	114	10.94786	9.99726	34
27	9.05052	112	9.05328	113	10.94672	9.99724	33
28	9.05164	111	9.05441	112	10.94559	9.99723	32
29	9.05275	111	9.05553	113	10.94447	9.99721	31
30	9.05386	111	9.05666	112	10.94334	9.99720	30
31	9.05497	110	9.05778	112	10.94222	9.99718	29
32	9.05607	110	9.05890	112	10.94110	9.99717	28
33	9.05717	110	9.06002	111	10.93998	9.99716	27
34	9.05827	110	9.06113	111	10.93887	9.99714	26
35	9.05937	109	9.06224	111	10.93776	9.99713	25
36	9.06046	109	9.06335	110	10.93665	9.99711	24
37	9.06155	109	9.06445	111	10.93555	9.99710	23
38	9.06264	108	9.06556	110	10.93444	9.99708	22
39	9.06372	109	9.06666	109	10.93334	9.99707	21
40	9.06481	108	9.06775	110	10.93225	9.99705	20
41	9.06589	107	9.06885	109	10.93115	9.99704	19
42	9.06696	108	9.06994	109	10.93006	9.99702	18
43	9.06804	107	9.07103	108	10.92897	9.99701	17
44	9.06911	107	9.07211	109	10.92789	9.99699	16
45	9.07018	106	9.07320	108	10.92680	9.99698	15
46	9.07124	107	9.07428	108	10.92572	9.99696	14
47	9.07231	106	9.07536	107	10.92464	9.99695	13
48	9.07337	105	9.07643	108	10.92357	9.99693	12
49	9.07442	106	9.07751	107	10.92249	9.99692	11
50	9.07548	105	9.07858	106	10.92142	9.99690	10
51	9.07653	105	9.07964	107	10.92036	9.99689	9
52	9.07758	105	9.08071	106	10.91929	9.99687	8
53	9.07863	105	9.08177	106	10.91823	9.99686	7
54	9.07968	104	9.08283	106	10.91717	9.99684	6
55	9.08072	104	9.08389	106	10.91611	9.99683	5
56	9.08176	104	9.08495	105	10.91505	9.99681	4
57	9.08280	103	9.08600	105	10.91400	9.99680	3
58	9.08383	103	9.08705	105	10.91295	9.99678	2
59	9.08486	103	9.08810	104	10.91190	9.99677	1
60	9.08589		9.08914		10.91086	9.99675	0
	Cof.		Cot.		Tang.	Sin.	

83 Degrees.

7 Degrees.

'	Sin.	Dif.	Tang.	Dif.	Cot.	Cof.	'
0	9.08589	103	9.08914	105	10.91086	9.99675	60
1	9.08692	103	9.09019	104	10.90981	9.99674	59
2	9.08795	102	9.09123	104	10.90877	9.99672	58
3	9.08897	102	9.09227	103	10.90773	9.99670	57
4	9.08999	102	9.09330	104	10.90670	9.99669	56
5	9.09101	101	9.09434	103	10.90566	9.99667	55
6	9.09202	102	9.09537	103	10.90463	9.99666	54
7	9.09304	101	9.09640	102	10.90360	9.99664	53
8	9.09405	101	9.09742	103	10.90258	9.99663	52
9	9.09506	100	9.09845	102	10.90155	9.99661	51
10	9.09606	101	9.09947	102	10.90053	9.99659	50
11	9.09707	100	9.10049	101	10.89951	9.99658	49
12	9.09807	100	9.10150	102	10.89850	9.99656	48
13	9.09907	99	9.10252	101	10.89748	9.99655	47
14	9.10006	100	9.10353	101	10.89647	9.99653	46
15	9.10106	99	9.10454	101	10.89546	9.99651	45
16	9.10205	99	9.10555	101	10.89445	9.99650	44
17	9.10304	98	9.10656	100	10.89344	9.99648	43
18	9.10402	99	9.10756	100	10.89244	9.99647	42
19	9.10501	98	9.10856	100	10.89144	9.99645	41
20	9.10599	98	9.10956	100	10.89044	9.99643	40
21	9.10697	98	9.11056	99	10.88944	9.99642	39
22	9.10795	98	9.11155	99	10.88845	9.99640	38
23	9.10893	97	9.11254	99	10.88746	9.99638	37
24	9.10990	97	9.11353	99	10.88647	9.99637	36
25	9.11087	97	9.11452	99	10.88548	9.99635	35
26	9.11184	97	9.11551	98	10.88449	9.99633	34
27	9.11281	96	9.11649	98	10.88351	9.99632	33
28	9.11377	97	9.11747	98	10.88253	9.99630	32
29	9.11474	96	9.11845	98	10.88155	9.99629	31
30	9.11570	96	9.11943	97	10.88057	9.99627	30
31	9.11666	95	9.12040	98	10.87960	9.99625	29
32	9.11761	96	9.12138	97	10.87862	9.99624	28
33	9.11857	95	9.12235	97	10.87765	9.99622	27
34	9.11952	95	9.12332	96	10.87668	9.99620	26
35	9.12047	95	9.12428	97	10.87572	9.99618	25
36	9.12142	94	9.12525	96	10.87475	9.99617	24
37	9.12236	95	9.12621	96	10.87379	9.99615	23
38	9.12331	94	9.12717	96	10.87283	9.99613	22
39	9.12425	94	9.12813	96	10.87187	9.99612	21
40	9.12519	93	9.12909	95	10.87091	9.99610	20
41	9.12612	94	9.13004	95	10.86996	9.99608	19
42	9.12706	93	9.13099	95	10.86901	9.99607	18
43	9.12799	93	9.13194	95	10.86806	9.99605	17
44	9.12892	93	9.13289	95	10.86711	9.99603	16
45	9.12985	93	9.13384	94	10.86616	9.99601	15
46	9.13078	93	9.13478	95	10.86522	9.99600	14
47	9.13171	92	9.13573	94	10.86427	9.99598	13
48	9.13263	92	9.13667	94	10.86333	9.99596	12
49	9.13355	92	9.13761	93	10.86239	9.99595	11
50	9.13447	92	9.13854	94	10.86146	9.99593	10
51	9.13539	91	9.13948	93	10.86052	9.99591	9
52	9.13630	92	9.14041	93	10.85959	9.99589	8
53	9.13722	91	9.14134	93	10.85866	9.99588	7
54	9.13813	91	9.14227	93	10.85773	9.99586	6
55	9.13904	90	9.14320	92	10.85680	9.99584	5
56	9.13994	91	9.14412	92	10.85588	9.99582	4
57	9.14085	90	9.14504	93	10.85496	9.99581	3
58	9.14175	91	9.14597	91	10.85403	9.99579	2
59	9.14266	90	9.14688	92	10.85312	9.99577	1
60	9.14356		9.14780		10.85220	9.99575	0
	Cof.		Cot.		Tang.	Sin.	

82 Degrees.

8 Degrees.

'	Sin.	D.	Tang.	D.	Cot.	Cof.	'
0	9.14356	89	9.14780	92	10.85220	9.99575	60
1	9.14445	90	9.14872	91	10.85128	9.99574	59
2	9.14535	89	9.14963	91	10.85037	9.99572	58
3	9.14624	90	9.15054	91	10.84946	9.99570	57
4	9.14714	89	9.15145	91	10.84855	9.99568	56
5	9.14803	88	9.15236	91	10.84764	9.99566	55
6	9.14891	89	9.15327	90	10.84673	9.99565	54
7	9.14980	89	9.15417	91	10.84583	9.99563	53
8	9.15069	88	9.15508	90	10.84492	9.99561	52
9	9.15157	88	9.15598	90	10.84402	9.99559	51
10	9.15245	88	9.15688	89	10.84312	9.99557	50
11	9.15333	88	9.15777	90	10.84223	9.99556	49
12	9.15421	87	9.15867	89	10.84133	9.99554	48
13	9.15508	88	9.15956	90	10.84044	9.99552	47
14	9.15596	87	9.16046	89	10.83954	9.99550	46
15	9.15683	87	9.16135	89	10.83865	9.99548	45
16	9.15770	87	9.16224	88	10.83776	9.99546	44
17	9.15857	87	9.16312	89	10.83688	9.99545	43
18	9.15944	86	9.16401	88	10.83599	9.99543	42
19	9.16030	86	9.16489	88	10.83511	9.99541	41
20	9.16116	87	9.16577	88	10.83423	9.99539	40
21	9.16203	86	9.16665	88	10.83335	9.99537	39
22	9.16289	85	9.16753	88	10.83247	9.99535	38
23	9.16374	86	9.16841	87	10.83159	9.99533	37
24	9.16460	85	9.16928	88	10.83072	9.99532	36
25	9.16545	86	9.17016	87	10.82984	9.99530	35
26	9.16631	85	9.17103	87	10.82897	9.99528	34
27	9.16716	85	9.17190	87	10.82810	9.99526	33
28	9.16801	85	9.17277	86	10.82723	9.99524	32
29	9.16886	84	9.17363	87	10.82637	9.99522	31
30	9.16970	85	9.17450	86	10.82550	9.99520	30
31	9.17055	84	9.17536	86	10.82464	9.99518	29
32	9.17139	84	9.17622	86	10.82378	9.99517	28
33	9.17223	84	9.17708	86	10.82292	9.99515	27
34	9.17307	84	9.17794	86	10.82206	9.99513	26
35	9.17391	83	9.17880	85	10.82120	9.99511	25
36	9.17474	84	9.17965	86	10.82035	9.99509	24
37	9.17558	83	9.18051	85	10.81949	9.99507	23
38	9.17641	83	9.18136	85	10.81864	9.99505	22
39	9.17724	83	9.18221	85	10.81779	9.99503	21
40	9.17807	83	9.18306	85	10.81694	9.99501	20
41	9.17890	83	9.18391	84	10.81609	9.99499	19
42	9.17973	82	9.18475	85	10.81525	9.99497	18
43	9.18055	82	9.18560	84	10.81440	9.99495	17
44	9.18137	83	9.18644	84	10.81356	9.99494	16
45	9.18220	82	9.18728	84	10.81272	9.99492	15
46	9.18302	81	9.18812	84	10.81188	9.99490	14
47	9.18383	82	9.18896	83	10.81104	9.99488	13
48	9.18465	82	9.18979	84	10.81021	9.99486	12
49	9.18547	81	9.19063	83	10.80937	9.99484	11
50	9.18628	81	9.19146	83	10.80854	9.99482	10
51	9.18709	81	9.19229	83	10.80771	9.99480	9
52	9.18790	81	9.19312	83	10.80688	9.99478	8
53	9.18871	81	9.19395	83	10.80605	9.99476	7
54	9.18952	81	9.19478	83	10.80522	9.99474	6
55	9.19033	80	9.19561	82	10.80439	9.99472	5
56	9.19113	80	9.19643	82	10.80357	9.99470	4
57	9.19193	80	9.19725	82	10.80275	9.99468	3
58	9.19273	80	9.19807	82	10.80193	9.99466	2
59	9.19353	80	9.19889	82	10.80111	9.99464	1
60	9.19433		9.19971		10.80029	9.99462	0
'	Cof.		Cot.		Tang.	Sin.	'

81 Degrees.

9 Degrees.

'	Sin.	D.	Tang.	D.	Cot.	Cof.	'
0	9.19433	80	9.19971	82	10.80029	9.99462	60
1	9.19513	79	9.20053	81	10.79947	9.99460	59
2	9.19592	80	9.20134	82	10.79866	9.99458	58
3	9.19672	79	9.20216	81	10.79784	9.99456	57
4	9.19751	79	9.20297	81	10.79703	9.99454	56
5	9.19830	79	9.20378	81	10.79622	9.99452	55
6	9.19909	79	9.20459	81	10.79541	9.99450	54
7	9.19988	79	9.20540	81	10.79460	9.99448	53
8	9.20067	78	9.20621	80	10.79379	9.99446	52
9	9.20145	78	9.20701	81	10.79299	9.99444	51
10	9.20223	79	9.20782	80	10.79218	9.99442	50
11	9.20302	78	9.20862	80	10.79138	9.99440	49
12	9.20380	78	9.20942	80	10.79058	9.99438	48
13	9.20458	77	9.21022	80	10.78978	9.99436	47
14	9.20535	78	9.21102	80	10.78898	9.99434	46
15	9.20613	78	9.21182	79	10.78818	9.99432	45
16	9.20691	77	9.21261	80	10.78739	9.99429	44
17	9.20768	77	9.21341	79	10.78659	9.99427	43
18	9.20845	77	9.21420	79	10.78580	9.99425	42
19	9.20922	77	9.21499	79	10.78501	9.99423	41
20	9.20999	77	9.21578	79	10.78422	9.99421	40
21	9.21076	77	9.21657	79	10.78343	9.99419	39
22	9.21153	76	9.21736	78	10.78264	9.99417	38
23	9.21229	77	9.21814	79	10.78186	9.99415	37
24	9.21306	76	9.21893	78	10.78107	9.99413	36
25	9.21382	76	9.21971	78	10.78029	9.99411	35
26	9.21458	76	9.22049	78	10.77951	9.99409	34
27	9.21534	76	9.22127	78	10.77873	9.99407	33
28	9.21610	75	9.22205	78	10.77795	9.99404	32
29	9.21685	76	9.22283	78	10.77717	9.99402	31
30	9.21761	75	9.22361	77	10.77639	9.99400	30
31	9.21836	76	9.22438	78	10.77562	9.99398	29
32	9.21912	75	9.22516	77	10.77484	9.99396	28
33	9.21987	75	9.22593	77	10.77407	9.99394	27
34	9.22062	75	9.22670	77	10.77330	9.99392	26
35	9.22137	74	9.22747	77	10.77253	9.99390	25
36	9.22211	75	9.22824	77	10.77176	9.99388	24
37	9.22286	75	9.22901	76	10.77099	9.99385	23
38	9.22361	74	9.22977	77	10.77023	9.99383	22
39	9.22435	74	9.23054	76	10.76946	9.99381	21
40	9.22509	74	9.23130	76	10.76870	9.99379	20
41	9.22583	74	9.23206	77	10.76794	9.99377	19
42	9.22657	74	9.23283	76	10.76717	9.99375	18
43	9.22731	74	9.23359	76	10.76641	9.99372	17
44	9.22805	73	9.23435	75	10.76565	9.99370	16
45	9.22878	74	9.23510	76	10.76490	9.99368	15
46	9.22952	73	9.23586	75	10.76414	9.99366	14
47	9.23025	73	9.23661	76	10.76339	9.99364	13
48	9.23098	73	9.23737	75	10.76263	9.99362	12
49	9.23171	73	9.23812	75	10.76188	9.99359	11
50	9.23244	73	9.23887	75	10.76113	9.99357	10
51	9.23317	73	9.23962	75	10.76038	9.99355	9
52	9.23390	72	9.24037	75	10.75963	9.99353	8
53	9.23462	73	9.24112	74	10.75888	9.99351	7
54	9.23535	72	9.24186	75	10.75814	9.99348	6
55	9.23607	72	9.24261	74	10.75739	9.99346	5
56	9.23679	73	9.24335	75	10.75665	9.99344	4
57	9.23752	71	9.24410	74	10.75590	9.99342	3
58	9.23823	72	9.24484	74	10.75516	9.99340	2
59	9.23895	72	9.24558	74	10.75442	9.99337	1
60	9.23967		9.24632		10.75368	9.99335	0
'	Cof.		Cot.		Tang.	Sin.	'

80 Degrees.

10 Degrees.

′	Sine.	D.	Tang.	D.	Cot.	Cos.	′
0	[illegible]		[illegible]		[illegible]	[illegible]	60
1	[illegible]		[illegible]		[illegible]	[illegible]	59
2	[illegible]		[illegible]		[illegible]	[illegible]	58
3	[illegible]		[illegible]		[illegible]	[illegible]	57
4	[illegible]		[illegible]		[illegible]	[illegible]	56
5	[illegible]		[illegible]		[illegible]	[illegible]	55
6	[illegible]		[illegible]		[illegible]	[illegible]	54
7	[illegible]		[illegible]		[illegible]	[illegible]	53
8	[illegible]		[illegible]		[illegible]	[illegible]	52
9	[illegible]		[illegible]		[illegible]	[illegible]	51
10	[illegible]		[illegible]		[illegible]	[illegible]	50
11	[illegible]		[illegible]		[illegible]	[illegible]	49
12	[illegible]		[illegible]		[illegible]	[illegible]	48
13	[illegible]		[illegible]		[illegible]	9.99306	47
14	[illegible]		[illegible]		[illegible]	9.99304	46
15	[illegible]		9.25727		[illegible]	[illegible]	45
16	[illegible]		[illegible]		[illegible]	[illegible]	44
17	[illegible]		[illegible]		[illegible]	[illegible]	43
18	[illegible]		[illegible]		[illegible]	9.99294	42
19	[illegible]		[illegible]		[illegible]	[illegible]	41
20	[illegible]		[illegible]		[illegible]	[illegible]	40
21	[illegible]		[illegible]		10.73842	9.99288	39
22	[illegible]		[illegible]		[illegible]	9.99285	38
23	[illegible]		[illegible]		[illegible]	9.99283	37
24	9.25652		[illegible]		[illegible]	[illegible]	36
25	[illegible]		[illegible]		[illegible]	9.99278	35
26	[illegible]		[illegible]		10.73486	9.99276	34
27	[illegible]		9.26585		[illegible]	9.99274	33
28	[illegible]		9.26655		10.73345	9.99271	32
29	[illegible]		9.26726	71	10.73274	9.99269	31
30	[illegible]		[illegible]		10.73203	9.99267	30
31	[illegible]		[illegible]		[illegible]	[illegible]	29
32	[illegible]		[illegible]		[illegible]	9.99262	28
33	[illegible]		9.27008		[illegible]	9.99260	27
34	[illegible]		9.27078		[illegible]	[illegible]	26
35	[illegible]		[illegible]		[illegible]	[illegible]	25
36	[illegible]		[illegible]		[illegible]	[illegible]	24
37	[illegible]		[illegible]		[illegible]	9.99250	23
38	[illegible]		[illegible]		[illegible]	9.99248	22
39	[illegible]		[illegible]		[illegible]	9.99245	21
40	9.26739		[illegible]		[illegible]	[illegible]	20
41	[illegible]		[illegible]		[illegible]	[illegible]	19
42	[illegible]		[illegible]		10.72365	9.99238	18
43	[illegible]		[illegible]		[illegible]	[illegible]	17
44	[illegible]		[illegible]		[illegible]	[illegible]	16
45	[illegible]		[illegible]		[illegible]	[illegible]	15
46	[illegible]		[illegible]		10.72089	9.99229	14
47	[illegible]		[illegible]		[illegible]	[illegible]	13
48	[illegible]		[illegible]		[illegible]	[illegible]	12
49	[illegible]		[illegible]		[illegible]	[illegible]	11
50	[illegible]		[illegible]		[illegible]	[illegible]	10
51	[illegible]		[illegible]		[illegible]	[illegible]	9
52	[illegible]		[illegible]		[illegible]	[illegible]	8
53	[illegible]		[illegible]		[illegible]	9.99212	7
54	[illegible]		[illegible]		[illegible]	[illegible]	6
55	[illegible]		[illegible]		[illegible]	[illegible]	5
56	[illegible]		[illegible]		[illegible]	[illegible]	4
57	[illegible]		[illegible]		[illegible]	9.99202	3
58	[illegible]		[illegible]		[illegible]	9.99200	2
59	[illegible]		[illegible]		[illegible]	[illegible]	1
60	[illegible]		[illegible]		[illegible]	[illegible]	0
′	Cos.		Cot.		Tang.	Sine.	′

79 Degrees.

11 Degrees.

′	Sine.	D.	Tang.	D.	Cot.	Cos.	′
0	[illegible]		[illegible]		[illegible]	[illegible]	60
1	9.28125		[illegible]		[illegible]	[illegible]	59
2	[illegible]		[illegible]		[illegible]	[illegible]	58
3	[illegible]		[illegible]		[illegible]	[illegible]	57
4	[illegible]		[illegible]		[illegible]	[illegible]	56
5	[illegible]		[illegible]		[illegible]	[illegible]	55
6	9.28448		[illegible]		[illegible]	[illegible]	54
7	[illegible]		[illegible]		[illegible]	[illegible]	53
8	9.28577		[illegible]	66	10.70598	9.99175	52
9	[illegible]		[illegible]		[illegible]	[illegible]	51
10	9.28705		[illegible]		[illegible]	[illegible]	50
11	[illegible]		[illegible]		[illegible]	[illegible]	49
12	[illegible]		[illegible]		[illegible]	[illegible]	48
13	[illegible]		[illegible]		[illegible]	[illegible]	47
14	[illegible]		[illegible]		[illegible]	[illegible]	46
15	[illegible]		[illegible]		[illegible]	[illegible]	45
16	9.29087		[illegible]		10.70068	9.99155	44
17	[illegible]		[illegible]		[illegible]	[illegible]	43
18	[illegible]		[illegible]		[illegible]	[illegible]	42
19	[illegible]		[illegible]		[illegible]	[illegible]	41
20	[illegible]		[illegible]		[illegible]	[illegible]	40
21	[illegible]		[illegible]		[illegible]	[illegible]	39
22	[illegible]		[illegible]		[illegible]	[illegible]	38
23	[illegible]		[illegible]		10.69609	9.99137	37
24	[illegible]		[illegible]		[illegible]	[illegible]	36
25	[illegible]		[illegible]		[illegible]	[illegible]	35
26	[illegible]		[illegible]		[illegible]	[illegible]	34
27	[illegible]		[illegible]		[illegible]	[illegible]	33
28	[illegible]		[illegible]		[illegible]	[illegible]	32
29	[illegible]		[illegible]		[illegible]	[illegible]	31
30	[illegible]		[illegible]		[illegible]	[illegible]	30
31	[illegible]		[illegible]		[illegible]	9.99117	29
32	[illegible]		[illegible]		[illegible]	[illegible]	28
33	9.30151		[illegible]		[illegible]	[illegible]	27
34	[illegible]		[illegible]		[illegible]	[illegible]	26
35	[illegible]		[illegible]		[illegible]	[illegible]	25
36	[illegible]		[illegible]		10.68767	9.99104	24
37	[illegible]		[illegible]		[illegible]	[illegible]	23
38	[illegible]		[illegible]		[illegible]	[illegible]	22
39	[illegible]		[illegible]		10.68575	9.99096	21
40	[illegible]		[illegible]		[illegible]	[illegible]	20
41	[illegible]		[illegible]		[illegible]	[illegible]	19
42	[illegible]		[illegible]		[illegible]	[illegible]	18
43	[illegible]		[illegible]		[illegible]	[illegible]	17
44	[illegible]		[illegible]		[illegible]	[illegible]	16
45	[illegible]		[illegible]		10.68194	9.99080	15
46	[illegible]		[illegible]		[illegible]	[illegible]	14
47	[illegible]		[illegible]		[illegible]	[illegible]	13
48	[illegible]		[illegible]		[illegible]	[illegible]	12
49	[illegible]		[illegible]		[illegible]	[illegible]	11
50	[illegible]		[illegible]		[illegible]	[illegible]	10
51	[illegible]		[illegible]		[illegible]	[illegible]	9
52	[illegible]		[illegible]		[illegible]	[illegible]	8
53	[illegible]		9.32311	63	10.67689	9.99059	7
54	[illegible]		[illegible]		[illegible]	[illegible]	6
55	9.31490		9.32436	63	10.67564	9.99054	5
56	[illegible]		[illegible]		[illegible]	[illegible]	4
57	[illegible]		[illegible]		[illegible]	[illegible]	3
58	[illegible]		[illegible]		[illegible]	[illegible]	2
59	[illegible]		[illegible]		[illegible]	[illegible]	1
60	[illegible]		[illegible]		[illegible]	[illegible]	0
′	Cos.		Cot.		Tang.	Sine.	′

78 Degrees.

LOGARITHMIC SINES AND TANGENTS.

12 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Cof.	′
0	9.31788	59	9.32747	63	10.67253	9.99040	60
1	9.31847	60	9.32810	62	10.67190	9.99038	59
2	9.31907	59	9.32872	61	10.67128	9.99035	58
3	9.31966	59	9.32933	62	10.67067	9.99032	57
4	9.32025	59	9.32995	62	10.67005	9.99030	56
5	9.32084	59	9.33057	62	10.66943	9.99027	55
6	9.32143	59	9.33119	61	10.66881	9.99024	54
7	9.32202	59	9.33180	62	10.66820	9.99022	53
8	9.32261	58	9.33242	61	10.66758	9.99019	52
9	9.32319	59	9.33303	62	10.66697	9.99016	51
10	9.32378	59	9.33365	61	10.66635	9.99013	50
11	9.32437	58	9.33426	61	10.66574	9.99011	49
12	9.32495	58	9.33487	61	10.66513	9.99008	48
13	9.32553	59	9.33548	61	10.66452	9.99005	47
14	9.32612	58	9.33609	61	10.66391	9.99002	46
15	9.32670	58	9.33670	61	10.66330	9.99000	45
16	9.32728	58	9.33731	61	10.66269	9.98997	44
17	9.32786	58	9.33792	61	10.66208	9.98994	43
18	9.32844	58	9.33853	60	10.66147	9.98991	42
19	9.32902	58	9.33913	61	10.66087	9.98989	41
20	9.32960	58	9.33974	60	10.66026	9.98986	40
21	9.33018	57	9.34034	61	10.65966	9.98983	39
22	9.33075	58	9.34095	60	10.65905	9.98980	38
23	9.33133	57	9.34155	60	10.65845	9.98978	37
24	9.33190	58	9.34215	61	10.65785	9.98975	36
25	9.33248	57	9.34276	60	10.65724	9.98972	35
26	9.33305	57	9.34336	60	10.65664	9.98969	34
27	9.33362	58	9.34396	60	10.65604	9.98967	33
28	9.33420	57	9.34456	60	10.65544	9.98964	32
29	9.33477	57	9.34516	60	10.65484	9.98961	31
30	9.33534	57	9.34576	59	10.65424	9.98958	30
31	9.33591	56	9.34635	60	10.65365	9.98955	29
32	9.33647	57	9.34695	60	10.65305	9.98953	28
33	9.33704	57	9.34755	59	10.65245	9.98950	27
34	9.33761	57	9.34814	60	10.65186	9.98947	26
35	9.33818	56	9.34874	59	10.65126	9.98944	25
36	9.33874	57	9.34933	59	10.65067	9.98941	24
37	9.33931	56	9.34992	59	10.65008	9.98938	23
38	9.33987	56	9.35051	60	10.64949	9.98936	22
39	9.34043	57	9.35111	59	10.64889	9.98933	21
40	9.34100	56	9.35170	59	10.64830	9.98930	20
41	9.34156	56	9.35229	59	10.64771	9.98927	19
42	9.34212	56	9.35288	59	10.64712	9.98924	18
43	9.34268	56	9.35347	58	10.64653	9.98921	17
44	9.34324	56	9.35405	59	10.64595	9.98919	16
45	9.34380	56	9.35464	59	10.64536	9.98916	15
46	9.34436	55	9.35523	58	10.64477	9.98913	14
47	9.34491	56	9.35581	59	10.64419	9.98910	13
48	9.34547	55	9.35640	58	10.64360	9.98907	12
49	9.34602	56	9.35698	59	10.64302	9.98904	11
50	9.34658	55	9.35757	58	10.64243	9.98901	10
51	9.34713	56	9.35815	58	10.64185	9.98898	9
52	9.34769	55	9.35873	58	10.64127	9.98896	8
53	9.34824	55	9.35931	58	10.64069	9.98893	7
54	9.34879	55	9.35989	58	10.64011	9.98890	6
55	9.34934	55	9.36047	58	10.63953	9.98887	5
56	9.34989	55	9.36105	58	10.63895	9.98884	4
57	9.35044	55	9.36163	58	10.63837	9.98881	3
58	9.35099	55	9.36221	58	10.63779	9.98878	2
59	9.35154	55	9.36279	57	10.63721	9.98875	1
60	9.35209		9.36336		10.63664	9.98872	0
′	Cof.		Cot.		Tang.	Sin.	′

77 Degrees.

13 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Cof.	′
0	9.35209	54	9.36336	58	10.63664	9.98872	60
1	9.35263	55	9.36394	58	10.63606	9.98869	59
2	9.35318	55	9.36452	57	10.63548	9.98867	58
3	9.35373	54	9.36509	57	10.63491	9.98864	57
4	9.35427	54	9.36566	58	10.63434	9.98861	56
5	9.35481	55	9.36624	57	10.63376	9.98858	55
6	9.35536	54	9.36681	57	10.63319	9.98855	54
7	9.35590	54	9.36738	57	10.63262	9.98852	53
8	9.35644	54	9.36795	57	10.63205	9.98849	52
9	9.35698	54	9.36852	57	10.63148	9.98846	51
10	9.35752	54	9.36909	57	10.63091	9.98843	50
11	9.35806	54	9.36966	57	10.63034	9.98840	49
12	9.35860	54	9.37023	57	10.62977	9.98837	48
13	9.35914	54	9.37080	57	10.62920	9.98834	47
14	9.35968	54	9.37137	56	10.62863	9.98831	46
15	9.36022	53	9.37193	57	10.62807	9.98828	45
16	9.36075	54	9.37250	56	10.62750	9.98825	44
17	9.36129	53	9.37306	57	10.62694	9.98822	43
18	9.36182	54	9.37363	56	10.62637	9.98819	42
19	9.36236	53	9.37419	57	10.62581	9.98816	41
20	9.36289	53	9.37476	56	10.62524	9.98813	40
21	9.36342	53	9.37532	56	10.62468	9.98810	39
22	9.36395	54	9.37588	56	10.62412	9.98807	38
23	9.36449	53	9.37644	56	10.62356	9.98804	37
24	9.36502	53	9.37700	56	10.62300	9.98801	36
25	9.36555	53	9.37756	56	10.62244	9.98798	35
26	9.36608	52	9.37812	56	10.62188	9.98795	34
27	9.36660	53	9.37868	56	10.62132	9.98792	33
28	9.36713	53	9.37924	56	10.62076	9.98789	32
29	9.36766	53	9.37980	55	10.62020	9.98786	31
30	9.36819	52	9.38035	56	10.61965	9.98783	30
31	9.36871	53	9.38091	56	10.61909	9.98780	29
32	9.36924	52	9.38147	55	10.61853	9.98777	28
33	9.36976	52	9.38202	55	10.61798	9.98774	27
34	9.37028	53	9.38257	56	10.61743	9.98771	26
35	9.37081	52	9.38313	55	10.61687	9.98768	25
36	9.37133	52	9.38368	55	10.61632	9.98765	24
37	9.37185	52	9.38423	56	10.61577	9.98762	23
38	9.37237	52	9.38479	55	10.61521	9.98759	22
39	9.37289	52	9.38534	55	10.61466	9.98756	21
40	9.37341	52	9.38589	55	10.61411	9.98753	20
41	9.37393	52	9.38644	55	10.61356	9.98750	19
42	9.37445	52	9.38699	55	10.61301	9.98746	18
43	9.37497	52	9.38754	54	10.61246	9.98743	17
44	9.37549	51	9.38808	55	10.61192	9.98740	16
45	9.37600	52	9.38863	55	10.61137	9.98737	15
46	9.37652	51	9.38918	54	10.61082	9.98734	14
47	9.37703	52	9.38972	55	10.61028	9.98731	13
48	9.37755	51	9.39027	55	10.60973	9.98728	12
49	9.37806	52	9.39082	54	10.60918	9.98725	11
50	9.37858	51	9.39136	54	10.60864	9.98722	10
51	9.37909	51	9.39190	55	10.60810	9.98719	9
52	9.37960	51	9.39245	54	10.60755	9.98715	8
53	9.38011	51	9.39299	54	10.60701	9.98712	7
54	9.38062	51	9.39353	54	10.60647	9.98709	6
55	9.38113	51	9.39407	54	10.60593	9.98706	5
56	9.38164	51	9.39461	54	10.60539	9.98703	4
57	9.38215	51	9.39515	54	10.60485	9.98700	3
58	9.38266	51	9.39569	54	10.60431	9.98697	2
59	9.38317	51	9.39623	54	10.60377	9.98694	1
60	9.38368		9.39677		10.60323	9.98690	0
′	Cof.		Cot.		Tang.	Sin.	′

76 Degrees.

14 Degrees.

'	Sin.	D.	Tang.	D.	Cot.	Cof.	'
0	9.38368		9.39677		10.60323	9.98690	60
1	9.38418	50	9.39731	54	10.60269	9.98687	59
2	9.38469	51	9.39785	54	10.60215	9.98684	58
3	9.38519	50	9.39838	53	10.60162	9.98681	57
4	9.38570	51	9.39892	54	10.60108	9.98678	56
5	9.38620	50	9.39945	53	10.60055	9.98675	55
6	9.38670	50	9.39999	54	10.60001	9.98671	54
7	9.38721	51	9.40052	53	10.59948	9.98668	53
8	9.38771	50	9.40106	54	10.59894	9.98665	52
9	9.38821	50	9.40159	53	10.59841	9.98662	51
10	9.38871	50	9.40212	53	10.59788	9.98659	50
11	9.38921	50	9.40266	54	10.59734	9.98656	49
12	9.38971	50	9.40319	53	10.59681	9.98652	48
13	9.39021	50	9.40372	53	10.59628	9.98649	47
14	9.39071	50	9.40425	53	10.59575	9.98646	46
15	9.39121	50	9.40478	53	10.59522	9.98643	45
16	9.39170	49	9.40531	53	10.59469	9.98640	44
17	9.39220	50	9.40584	53	10.59416	9.98636	43
18	9.39270	50	9.40636	52	10.59364	9.98633	42
19	9.39319	49	9.40689	53	10.59311	9.98630	41
20	9.39369	50	9.40742	53	10.59258	9.98627	40
21	9.39418	49	9.40795	53	10.59205	9.98623	39
22	9.39467	49	9.40847	52	10.59153	9.98620	38
23	9.39517	50	9.40900	53	10.59100	9.98617	37
24	9.39566	49	9.40952	52	10.59048	9.98614	36
25	9.39615	49	9.41005	53	10.58995	9.98610	35
26	9.39664	49	9.41057	52	10.58943	9.98607	34
27	9.39713	49	9.41109	52	10.58891	9.98604	33
28	9.39762	49	9.41161	52	10.58839	9.98601	32
29	9.39811	49	9.41214	53	10.58786	9.98597	31
30	9.39860	49	9.41266	52	10.58734	9.98594	30
31	9.39909	49	9.41318	52	10.58682	9.98591	29
32	9.39958	49	9.41370	52	10.58630	9.98588	28
33	9.40006	48	9.41422	52	10.58578	9.98584	27
34	9.40055	49	9.41474	52	10.58526	9.98581	26
35	9.40103	48	9.41526	52	10.58474	9.98578	25
36	9.40152	49	9.41578	52	10.58422	9.98574	24
37	9.40200	48	9.41629	51	10.58371	9.98571	23
38	9.40249	49	9.41681	52	10.58319	9.98568	22
39	9.40297	48	9.41733	52	10.58267	9.98565	21
40	9.40346	49	9.41784	51	10.58216	9.98561	20
41	9.40394	48	9.41836	52	10.58164	9.98558	19
42	9.40442	48	9.41887	51	10.58113	9.98555	18
43	9.40490	48	9.41939	52	10.58061	9.98551	17
44	9.40538	48	9.41990	51	10.58010	9.98548	16
45	9.40586	48	9.42041	51	10.57959	9.98545	15
46	9.40634	48	9.42093	52	10.57907	9.98541	14
47	9.40682	48	9.42144	51	10.57856	9.98538	13
48	9.40730	48	9.42195	51	10.57805	9.98535	12
49	9.40778	48	9.42246	51	10.57754	9.98531	11
50	9.40825	47	9.42297	51	10.57703	9.98528	10
51	9.40873	48	9.42348	51	10.57652	9.98525	9
52	9.40921	48	9.42399	51	10.57601	9.98521	8
53	9.40968	47	9.42450	51	10.57550	9.98518	7
54	9.41016	48	9.42501	51	10.57499	9.98515	6
55	9.41063	47	9.42552	51	10.57448	9.98511	5
56	9.41111	48	9.42603	51	10.57397	9.98508	4
57	9.41158	47	9.42653	50	10.57347	9.98505	3
58	9.41205	47	9.42704	51	10.57296	9.98501	2
59	9.41252	47	9.42755	51	10.57245	9.98498	1
60	9.41300	48	9.42805	50	10.57195	9.98494	0
	Cof.		Cot.		Tang.	Sine.	

75 Degrees.

15 Degrees.

'	Sin.	D.	Tang.	D.	Cot.	Cof.	'
0	9.41300		9.42805		10.57195	9.98494	60
1	9.41347	47	9.42856	51	10.57144	9.98491	59
2	9.41394	47	9.42906	50	10.57094	9.98488	58
3	9.41441	47	9.42957	51	10.57043	9.98484	57
4	9.41488	47	9.43007	50	10.56993	9.98481	56
5	9.41535	47	9.43057	50	10.56943	9.98477	55
6	9.41582	47	9.43108	51	10.56892	9.98474	54
7	9.41628	46	9.43158	50	10.56842	9.98471	53
8	9.41675	47	9.43208	50	10.56792	9.98467	52
9	9.41722	47	9.43258	50	10.56742	9.98464	51
10	9.41768	46	9.43308	50	10.56692	9.98460	50
11	9.41815	47	9.43358	50	10.56642	9.98457	49
12	9.41861	46	9.43408	50	10.56592	9.98453	48
13	9.41908	47	9.43458	50	10.56542	9.98450	47
14	9.41954	46	9.43508	50	10.56492	9.98447	46
15	9.42001	47	9.43558	50	10.56442	9.98443	45
16	9.42047	46	9.43607	49	10.56393	9.98440	44
17	9.42093	46	9.43657	50	10.56343	9.98436	43
18	9.42140	47	9.43707	50	10.56293	9.98433	42
19	9.42186	46	9.43756	49	10.56244	9.98429	41
20	9.42232	46	9.43806	50	10.56194	9.98426	40
21	9.42278	46	9.43855	49	10.56145	9.98422	39
22	9.42324	46	9.43905	50	10.56095	9.98419	38
23	9.42370	46	9.43954	49	10.56046	9.98415	37
24	9.42416	46	9.44004	50	10.55996	9.98412	36
25	9.42461	45	9.44053	49	10.55947	9.98409	35
26	9.42507	46	9.44102	49	10.55898	9.98405	34
27	9.42553	46	9.44151	49	10.55849	9.98402	33
28	9.42599	46	9.44201	50	10.55799	9.98398	32
29	9.42644	45	9.44250	49	10.55750	9.98395	31
30	9.42690	46	9.44299	49	10.55701	9.98391	30
31	9.42735	45	9.44348	49	10.55652	9.98388	29
32	9.42781	46	9.44397	49	10.55603	9.98384	28
33	9.42826	45	9.44446	49	10.55554	9.98381	27
34	9.42872	46	9.44495	49	10.55505	9.98377	26
35	9.42917	45	9.44544	49	10.55456	9.98373	25
36	9.42962	45	9.44592	48	10.55408	9.98370	24
37	9.43008	46	9.44641	49	10.55359	9.98366	23
38	9.43053	45	9.44690	49	10.55310	9.98363	22
39	9.43098	45	9.44738	48	10.55262	9.98359	21
40	9.43143	45	9.44787	49	10.55213	9.98356	20
41	9.43188	45	9.44836	49	10.55164	9.98352	19
42	9.43233	45	9.44884	48	10.55116	9.98349	18
43	9.43278	45	9.44933	49	10.55067	9.98345	17
44	9.43323	45	9.44981	48	10.55019	9.98342	16
45	9.43367	44	9.45029	48	10.54971	9.98338	15
46	9.43412	45	9.45078	49	10.54922	9.98334	14
47	9.43457	45	9.45126	48	10.54874	9.98331	13
48	9.43502	45	9.45174	48	10.54826	9.98327	12
49	9.43546	44	9.45222	48	10.54778	9.98324	11
50	9.43591	45	9.45271	49	10.54729	9.98320	10
51	9.43635	44	9.45319	48	10.54681	9.98317	9
52	9.43680	45	9.45367	48	10.54633	9.98313	8
53	9.43724	44	9.45415	48	10.54585	9.98309	7
54	9.43769	45	9.45463	48	10.54537	9.98306	6
55	9.43813	44	9.45511	48	10.54489	9.98302	5
56	9.43857	44	9.45559	48	10.54441	9.98299	4
57	9.43901	44	9.45606	47	10.54394	9.98295	3
58	9.43946	45	9.45654	48	10.54346	9.98291	2
59	9.43990	44	9.45702	48	10.54298	9.98288	1
60	9.44034	44	9.45750	48	10.54250	9.98284	0
	Cof.		Cot.		Tang.	Sine.	

74 Degrees.

16 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Cof.	′
0	9.44034	44	9.45750	47	10.54250	9.98284	60
1	9.44078	44	9.45797	48	10.54203	9.98281	59
2	9.44122	44	9.45845	47	10.54155	9.98277	58
3	9.44166	44	9.45892	48	10.54108	9.98273	57
4	9.44210	43	9.45940	47	10.54060	9.98270	56
5	9.44253	44	9.45987	48	10.54013	9.98266	55
6	9.44297	44	9.46035	47	10.53965	9.98262	54
7	9.44341	44	9.46082	48	10.53618	9.98259	53
8	9.44385	43	9.46130	47	10.53870	9.98255	52
9	9.44428	44	9.46177	47	10.53823	9.98211	51
10	9.44472	44	9.46224	47	10.53776	9.98248	50
11	9.44516	43	9.46271	48	10.53729	9.98244	49
12	9.44559	43	9.46319	47	10.53681	9.98240	48
13	9.44602	44	9.46366	47	10.53634	9.98237	47
14	9.44646	43	9.46413	47	10.53587	9.98233	46
15	9.44689	44	9.46460	47	10.53540	9.98229	45
16	9.44733	43	9.46507	47	10.53493	9.98226	44
17	9.44776	43	9.46554	47	10.53446	9.98222	43
18	9.44819	43	9.46601	47	10.53399	9.98218	42
19	9.44862	43	9.46648	46	10.53352	9.98215	41
20	9.44905	43	9.46694	47	10.53306	9.98211	40
21	9.44948	44	9.46741	47	10.53259	9.98207	39
22	9.44992	43	9.46788	47	10.53212	9.98204	38
23	9.45035	42	9.46835	46	10.53165	9.98200	37
24	9.45077	43	9.46881	47	10.53119	9.98196	36
25	9.45120	43	9.46928	47	10.53072	9.98192	35
26	9.45163	43	9.46975	46	10.53025	9.98189	34
27	9.45206	43	9.47021	47	10.52979	9.98185	33
28	9.45249	43	9.47068	46	10.52932	9.98181	32
29	9.45292	42	9.47114	46	10.52886	9.98177	31
30	9.45334	43	9.47160	47	10.52840	9.98174	30
31	9.45377	42	9.47207	46	10.52793	9.98170	29
32	9.45419	43	9.47253	46	10.52747	9.98166	28
33	9.45462	42	9.47299	47	10.52701	9.98162	27
34	9.45504	43	9.47346	46	10.52654	9.98159	26
35	9.45547	42	9.47392	46	10.52608	9.98155	25
36	9.45589	43	9.47438	46	10.52562	9.98151	24
37	9.45632	42	9.47484	46	10.52516	9.98147	23
38	9.45674	42	9.47530	46	10.52470	9.98144	22
39	9.45716	42	9.47576	46	10.52424	9.98140	21
40	9.45758	43	9.47622	46	10.52378	9.98136	20
41	9.45801	42	9.47668	46	10.52332	9.98132	19
42	9.45843	42	9.47714	46	10.52286	9.98129	18
43	9.45885	42	9.47760	46	10.52240	9.98125	17
44	9.45927	42	9.47806	46	10.52194	9.98121	16
45	9.45969	42	9.47852	45	10.52148	9.98117	15
46	9.46011	42	9.47897	46	10.52103	9.98113	14
47	9.46053	42	9.47943	46	10.52057	9.98110	13
48	9.46095	41	9.47989	46	10.52011	9.98106	12
49	9.46136	42	9.48035	45	10.51965	9.98102	11
50	9.46178	42	9.48080	46	10.51920	9.98098	10
51	9.46220	42	9.48126	45	10.51874	9.98094	9
52	9.46262	41	9.48171	46	10.51829	9.98090	8
53	9.46303	42	9.48217	45	10.51783	9.98087	7
54	9.46345	41	9.48262	45	10.51738	9.98083	6
55	9.46386	42	9.48307	46	10.51693	9.98079	5
56	9.46428	41	9.48353	45	10.51647	9.98075	4
57	9.46469	42	9.48398	45	10.51602	9.98071	3
58	9.46511	41	9.48443	46	10.51557	9.98067	2
59	9.46552	42	9.48489	45	10.51511	9.98063	1
60	9.46594		9.48534		10.51466	9.98060	0
	Cof.		Cot.		Tang.	Sin.	

73 Degrees.

17 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Cof.	′
0	9.46594	41	9.48534	45	10.51466	9.98060	60
1	9.46635	41	9.48579	45	10.51421	9.98056	59
2	9.46676	41	9.48624	45	10.51376	9.98052	58
3	9.46717	41	9.48669	45	10.51331	9.98048	57
4	9.46758	42	9.48714	45	10.51286	9.98044	56
5	9.46800	41	9.48759	45	10.51241	9.98040	55
6	9.46841	41	9.48804	45	10.51196	9.98036	54
7	9.46882	41	9.48849	45	10.51151	9.98032	53
8	9.46923	41	9.48894	45	10.51106	9.98029	52
9	9.46964	41	9.48939	45	10.51061	9.98025	51
10	9.47005	40	9.48984	45	10.51016	9.98021	50
11	9.47045	41	9.49029	44	10.50971	9.98017	49
12	9.47086	41	9.49073	45	10.50927	9.98013	48
13	9.47127	41	9.49118	45	10.50882	9.98009	47
14	9.47168	41	9.49163	44	10.50837	9.98005	46
15	9.47209	40	9.49207	45	10.50793	9.98001	45
16	9.47249	41	9.49252	44	10.50748	9.97997	44
17	9.47290	40	9.49296	45	10.50704	9.97993	43
18	9.47330	41	9.49341	44	10.50659	9.97989	42
19	9.47371	40	9.49385	45	10.50615	9.97986	41
20	9.47411	41	9.49430	44	10.50570	9.97982	40
21	9.47452	40	9.49474	45	10.50526	9.97978	39
22	9.47492	41	9.49519	44	10.50481	9.97974	38
23	9.47533	40	9.49563	44	10.50437	9.97970	37
24	9.47573	40	9.49607	45	10.50393	9.97966	36
25	9.47613	41	9.49652	44	10.50348	9.97962	35
26	9.47654	40	9.49696	44	10.50304	9.97958	34
27	9.47694	40	9.49740	44	10.50260	9.97954	33
28	9.47734	40	9.49784	44	10.50216	9.97950	32
29	9.47774	40	9.49828	44	10.50172	9.97946	31
30	9.47814	40	9.49872	44	10.50128	9.97942	30
31	9.47854	40	9.49916	44	10.50084	9.97938	29
32	9.47894	40	9.49960	44	10.50040	9.97934	28
33	9.47934	40	9.50004	44	10.49996	9.97930	27
34	9.47974	40	9.50048	44	10.49952	9.97926	26
35	9.48014	40	9.50092	44	10.49908	9.97922	25
36	9.48054	40	9.50136	44	10.49864	9.97918	24
37	9.48094	39	9.50180	43	10.49820	9.97914	23
38	9.48133	40	9.50223	44	10.49777	9.97910	22
39	9.48173	40	9.50267	44	10.49733	9.97906	21
40	9.48213	39	9.50311	44	10.49689	9.97902	20
41	9.48252	40	9.50355	43	10.49645	9.97898	19
42	9.48292	40	9.50398	44	10.49602	9.97894	18
43	9.48332	39	9.50442	43	10.49558	9.97890	17
44	9.48371	40	9.50485	44	10.49515	9.97886	16
45	9.48411	39	9.50529	43	10.49471	9.97882	15
46	9.48450	40	9.50572	44	10.49428	9.97878	14
47	9.48490	39	9.50616	43	10.49384	9.97874	13
48	9.48529	39	9.50659	44	10.49341	9.97870	12
49	9.48568	39	9.50703	43	10.49297	9.97866	11
50	9.48607	40	9.50746	43	10.49254	9.97861	10
51	9.48647	39	9.50789	44	10.49211	9.97857	9
52	9.48686	39	9.50833	43	10.49167	9.97853	8
53	9.48725	39	9.50876	43	10.49124	9.97849	7
54	9.48764	39	9.50919	43	10.49081	9.97845	6
55	9.48803	39	9.50962	43	10.49038	9.97841	5
56	9.48842	39	9.51005	43	10.48995	9.97837	4
57	9.48881	39	9.51048	44	10.48952	9.97833	3
58	9.48920	39	9.51092	43	10.48908	9.97829	2
59	9.48959	39	9.51135	43	10.48865	9.97825	1
60	9.48998		9.51178		10.48822	9.97821	0
	Cof.		Cot.		Tang.	Sin.	

72 Degrees.

18 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Coſ.	D.	′
0	9.48998	39	9.51178	43	10.48822	9.97821	4	60
1	9.49037	39	9.51221	43	10.48779	9.97817	5	59
2	9.49076	39	9.51264	42	10.48736	9.97812	4	58
3	9.49115	38	9.51306	43	10.48694	9.97808	4	57
4	9.49153	39	9.51349	43	10.48651	9.97804	4	56
5	9.49192	39	9.51392	43	10.48608	9.97800	4	55
6	9.49231	38	9.51435	43	10.48565	9.97796	4	54
7	9.49269	39	9.51478	42	10.48522	9.97792	4	53
8	9.49308	39	9.51520	43	10.48480	9.97788	4	52
9	9.49347	38	9.51563	43	10.48437	9.97784	5	51
10	9.49385	39	9.51606	42	10.48394	9.97779	4	50
11	9.49424	38	9.51648	43	10.48352	9.97775	4	49
12	9.49462	38	9.51691	43	10.48309	9.97771	4	48
13	9.49500	39	9.51734	42	10.48266	9.97767	4	47
14	9.49539	38	9.51776	43	10.48224	9.97763	4	46
15	9.49577	38	9.51819	42	10.48181	9.97759	5	45
16	9.49615	39	9.51861	42	10.48139	9.97754	4	44
17	9.49654	38	9.51903	43	10.48097	9.97750	4	43
18	9.49692	38	9.51946	42	10.48054	9.97746	4	42
19	9.49730	38	9.51988	43	10.48012	9.97742	4	41
20	9.49768	38	9.52031	42	10.47969	9.97738	4	40
21	9.49806	38	9.52073	42	10.47927	9.97734	5	39
22	9.49844	38	9.52115	42	10.47885	9.97729	4	38
23	9.49882	38	9.52157	43	10.47843	9.97725	4	37
24	9.49920	38	9.52200	42	10.47800	9.97721	4	36
25	9.49958	38	9.52242	42	10.47758	9.97717	4	35
26	9.49996	38	9.52284	42	10.47716	9.97713	5	34
27	9.50034	38	9.52326	42	10.47674	9.97708	4	33
28	9.50072	38	9.52368	42	10.47632	9.97704	4	32
29	9.50110	38	9.52410	42	10.47590	9.97700	4	31
30	9.50148	37	9.52452	42	10.47548	9.97696	5	30
31	9.50185	38	9.52494	42	10.47506	9.97691	4	29
32	9.50223	38	9.52536	42	10.47464	9.97687	4	28
33	9.50261	37	9.52578	42	10.47422	9.97683	4	27
34	9.50298	38	9.52620	41	10.47380	9.97679	5	26
35	9.50336	38	9.52661	42	10.47339	9.97674	4	25
36	9.50374	37	9.52703	42	10.47297	9.97670	4	24
37	9.50411	38	9.52745	42	10.47255	9.97666	4	23
38	9.50449	37	9.52787	42	10.47213	9.97662	5	22
39	9.50486	37	9.52829	41	10.47171	9.97657	4	21
40	9.50523	38	9.52870	42	10.47130	9.97653	4	20
41	9.50561	37	9.52912	41	10.47088	9.97649	4	19
42	9.50598	37	9.52953	42	10.47047	9.97645	5	18
43	9.50635	38	9.52995	42	10.47005	9.97640	4	17
44	9.50673	37	9.53037	41	10.46963	9.97636	4	16
45	9.50710	37	9.53078	42	10.46922	9.97632	4	15
46	9.50747	37	9.53120	41	10.46880	9.97628	5	14
47	9.50784	37	9.53161	41	10.46839	9.97623	4	13
48	9.50821	37	9.53202	42	10.46798	9.97619	4	12
49	9.50858	38	9.53244	41	10.46756	9.97615	5	11
50	9.50896	37	9.53285	42	10.46715	9.97610	4	10
51	9.50933	37	9.53327	41	10.46673	9.97606	4	9
52	9.50970	37	9.53368	41	10.46632	9.97602	5	8
53	9.51007	36	9.53409	41	10.46591	9.97597	4	7
54	9.51043	37	9.53450	42	10.46550	9.97593	4	6
55	9.51080	37	9.53492	41	10.46508	9.97589	5	5
56	9.51117	37	9.53533	41	10.46467	9.97584	4	4
57	9.51154	37	9.53574	41	10.46426	9.97580	4	3
58	9.51191	36	9.53615	41	10.46385	9.97576	5	2
59	9.51227	37	9.53656	41	10.46344	9.97571	4	1
60	9.51264		9.53697		10.46303	9.97567		0
	Coſ.		Cot.		Tang.	Sin.		

71 Degrees.

19 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Coſ.	D.	′
0	9.51264	37	9.53697	41	10.46303	9.97567	4	60
1	9.51301	37	9.53738	41	10.46262	9.97563	5	59
2	9.51338	36	9.53779	41	10.46221	9.97558	4	58
3	9.51374	37	9.53820	41	10.46180	9.97554	4	57
4	9.51411	36	9.53861	41	10.46139	9.97550	5	56
5	9.51447	37	9.53902	41	10.46098	9.97545	4	55
6	9.51484	36	9.53943	41	10.46057	9.97541	5	54
7	9.51520	37	9.53984	41	10.46016	9.97536	4	53
8	9.51557	36	9.54025	40	10.45975	9.97532	4	52
9	9.51593	36	9.54065	41	10.45935	9.97528	5	51
10	9.51629	37	9.54106	41	10.45894	9.97523	4	50
11	9.51666	36	9.54147	40	10.45853	9.97519	4	49
12	9.51702	36	9.54187	41	10.45813	9.97515	5	48
13	9.51738	36	9.54228	41	10.45772	9.97510	4	47
14	9.51774	37	9.54269	40	10.45731	9.97506	5	46
15	9.51811	36	9.54309	41	10.45691	9.97501	4	45
16	9.51847	36	9.54350	40	10.45650	9.97497	5	44
17	9.51883	36	9.54390	41	10.45610	9.97492	4	43
18	9.51919	36	9.54431	40	10.45569	9.97488	4	42
19	9.51955	36	9.54471	41	10.45529	9.97484	5	41
20	9.51991	36	9.54512	40	10.45488	9.97479	4	40
21	9.52027	36	9.54552	41	10.45448	9.97475	5	39
22	9.52063	36	9.54593	40	10.45407	9.97470	4	38
23	9.52099	36	9.54633	40	10.45367	9.97466	5	37
24	9.52135	36	9.54673	41	10.45327	9.97461	4	36
25	9.52171	36	9.54714	40	10.45286	9.97457	4	35
26	9.52207	35	9.54754	40	10.45246	9.97453	5	34
27	9.52242	36	9.54794	41	10.45206	9.97448	4	33
28	9.52278	36	9.54835	40	10.45165	9.97444	5	32
29	9.52314	36	9.54875	40	10.45125	9.97439	4	31
30	9.52350	35	9.54915	40	10.45085	9.97435	5	30
31	9.52385	36	9.54955	40	10.45045	9.97430	4	29
32	9.52421	35	9.54995	40	10.45005	9.97426	5	28
33	9.52456	36	9.55035	40	10.44965	9.97421	4	27
34	9.52492	35	9.55075	40	10.44925	9.97417	5	26
35	9.52527	36	9.55115	40	10.44885	9.97412	4	25
36	9.52563	35	9.55155	40	10.44845	9.97408	5	24
37	9.52598	36	9.55195	40	10.44805	9.97403	4	23
38	9.52634	35	9.55235	40	10.44765	9.97399	5	22
39	9.52669	36	9.55275	40	10.44725	9.97394	4	21
40	9.52705	35	9.55315	40	10.44685	9.97390	5	20
41	9.52740	35	9.55355	40	10.44645	9.97385	4	19
42	9.52775	36	9.55395	39	10.44605	9.97381	5	18
43	9.52811	35	9.55434	40	10.44566	9.97376	4	17
44	9.52846	35	9.55474	40	10.44526	9.97372	5	16
45	9.52881	35	9.55514	40	10.44486	9.97367	4	15
46	9.52916	35	9.55554	39	10.44446	9.97363	5	14
47	9.52951	35	9.55593	40	10.44407	9.97359	5	13
48	9.52986	35	9.55633	40	10.44367	9.97353	4	12
49	9.53021	35	9.55673	39	10.44327	9.97349	5	11
50	9.53056	36	9.55712	40	10.44288	9.97344	4	10
51	9.53092	34	9.55752	39	10.44248	9.97340	5	9
52	9.53126	35	9.55791	40	10.44209	9.97335	4	8
53	9.53161	35	9.55831	39	10.44169	9.97331	5	7
54	9.53196	35	9.55870	40	10.44130	9.97326	4	6
55	9.53231	35	9.55910	39	10.44090	9.97322	5	5
56	9.53266	35	9.55949	40	10.44051	9.97317	5	4
57	9.53301	35	9.55989	39	10.44011	9.97312	4	3
58	9.53336	34	9.56028	39	10.43972	9.97308	5	2
59	9.53370	35	9.56067	40	10.43933	9.97303	4	1
60	9.53405		9.56107		10.43893	9.97299		0
	Coſ.		Cot.		Tang.	Sin.		

70 Degrees.

20 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Coſ.	D.	′
0	9.53405	35	9.56107	39	10.43893	9.97299	5	60
1	9.53440	35	9.56146	39	10.43854	9.97294	5	59
2	9.53475	34	9.56185	39	10.43815	9.97289	4	58
3	9.53509	35	9.56224	40	10.43776	9.97285	5	57
4	9.53544	34	9.56264	39	10.43736	9.97280	4	56
5	9.53578	35	9.56303	39	10.43697	9.97276	5	55
6	9.53613	34	9.56342	39	10.43658	9.97271	5	54
7	9.53647	35	9.56381	39	10.43619	9.97266	4	53
8	9.53682	34	9.56420	39	10.43580	9.97262	5	52
9	9.53716	35	9.56459	39	10.43541	9.97257	5	51
10	9.53751	34	9.56498	39	10.43502	9.97252	4	50
11	9.53785	34	9.56537	39	10.43463	9.97248	5	49
12	9.53819	35	9.56576	39	10.43424	9.97243	5	48
13	9.53854	34	9.56615	39	10.43385	9.97238	4	47
14	9.53888	34	9.56654	39	10.43346	9.97234	5	46
15	9.53922	35	9.56693	39	10.43307	9.97229	5	45
16	9.53957	34	9.56732	39	10.43268	9.97224	4	44
17	9.53991	34	9.56771	39	10.43229	9.97220	5	43
18	9.54025	34	9.56810	39	10.43190	9.97215	5	42
19	9.54059	34	9.56849	38	10.43151	9.97210	4	41
20	9.54093	34	9.56887	39	10.43113	9.97206	5	40
21	9.54127	34	9.56926	39	10.43074	9.97201	5	39
22	9.54161	34	9.56965	39	10.43035	9.97196	4	38
23	9.54195	34	9.57004	38	10.42996	9.97192	5	37
24	9.54229	34	9.57042	39	10.42958	9.97187	5	36
25	9.54263	34	9.57081	39	10.42919	9.97182	4	35
26	9.54297	34	9.57120	38	10.42880	9.97178	5	34
27	9.54331	34	9.57158	39	10.42842	9.97173	5	33
28	9.54365	34	9.57197	38	10.42803	9.97168	5	32
29	9.54399	34	9.57235	39	10.42765	9.97163	4	31
30	9.54433	33	9.57274	38	10.42726	9.97159	5	30
31	9.54466	34	9.57312	39	10.42688	9.97154	5	29
32	9.54500	34	9.57351	38	10.42649	9.97149	4	28
33	9.54534	33	9.57389	39	10.42611	9.97145	5	27
34	9.54567	34	9.57428	38	10.42572	9.97140	5	26
35	9.54601	34	9.57466	38	10.42534	9.97135	5	25
36	9.54635	33	9.57504	39	10.42496	9.97130	4	24
37	9.54668	34	9.57543	38	10.42457	9.97126	5	23
38	9.54702	33	9.57581	38	10.42419	9.97121	5	22
39	9.54735	34	9.57619	39	10.42381	9.97116	5	21
40	9.54769	33	9.57658	38	10.42342	9.97111	4	20
41	9.54802	34	9.57696	38	10.42304	9.97107	5	19
42	9.54836	33	9.57734	38	10.42266	9.97102	5	18
43	9.54869	34	9.57772	38	10.42228	9.97097	5	17
44	9.54903	33	9.57810	39	10.42190	9.97092	5	16
45	9.54936	33	9.57849	38	10.42151	9.97087	4	15
46	9.54969	34	9.57887	38	10.42113	9.97083	5	14
47	9.55003	33	9.57925	38	10.42075	9.97078	5	13
48	9.55036	33	9.57963	38	10.42037	9.97073	5	12
49	9.55069	33	9.58001	38	10.41999	9.97068	5	11
50	9.55102	34	9.58039	38	10.41961	9.97063	4	10
51	9.55136	33	9.58077	38	10.41923	9.97059	5	9
52	9.55169	33	9.58115	38	10.41885	9.97054	5	8
53	9.55202	33	9.58153	38	10.41847	9.97049	5	7
54	9.55235	33	9.58191	38	10.41809	9.97044	5	6
55	9.55268	33	9.58229	38	10.41771	9.97039	4	5
56	9.55301	33	9.58267	38	10.41733	9.97035	5	4
57	9.55334	33	9.58305	37	10.41695	9.97030	5	3
58	9.55367	33	9.58342	38	10.41658	9.97025	5	2
59	9.55400	33	9.58380	38	10.41620	9.97020	5	1
60	9.55433		9.58418		10.41582	9.97015		0
	Coſ.		Cot.		Tang.	Sin.		

69 Degrees.

21 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Coſ.	D.	′
0	9.55433	33	9.58418	37	10.41582	9.97015	5	60
1	9.55466	33	9.58455	38	10.41545	9.97010	5	59
2	9.55499	33	9.58493	38	10.41507	9.97005	4	58
3	9.55532	32	9.58531	38	10.41469	9.97001	5	57
4	9.55564	33	9.58569	37	10.41431	9.96996	5	56
5	9.55597	33	9.58606	38	10.41394	9.96991	5	55
6	9.55630	33	9.58644	37	10.41356	9.96986	5	54
7	9.55663	32	9.58681	38	10.41319	9.96981	5	53
8	9.55695	33	9.58719	38	10.41281	9.96976	5	52
9	9.55728	33	9.58757	37	10.41243	9.96971	5	51
10	9.55761	32	9.58794	38	10.41206	9.96966	4	50
11	9.55793	33	9.58832	37	10.41168	9.96962	5	49
12	9.55826	32	9.58869	38	10.41131	9.96957	5	48
13	9.55858	33	9.58907	37	10.41093	9.96952	5	47
14	9.55891	32	9.58944	37	10.41056	9.96947	5	46
15	9.55923	33	9.58981	38	10.41019	9.96942	5	45
16	9.55956	32	9.59019	37	10.40981	9.96937	5	44
17	9.55988	33	9.59056	38	10.40944	9.96932	5	43
18	9.56021	32	9.59094	37	10.40906	9.96927	5	42
19	9.56053	32	9.59131	37	10.40869	9.96922	5	41
20	9.56085	33	9.59168	37	10.40832	9.96917	5	40
21	9.56118	32	9.59205	38	10.40795	9.96912	5	39
22	9.56150	32	9.59243	37	10.40757	9.96907	4	38
23	9.56182	33	9.59280	37	10.40720	9.96903	5	37
24	9.56215	32	9.59317	37	10.40683	9.96898	5	36
25	9.56247	32	9.59354	37	10.40646	9.96893	5	35
26	9.56279	32	9.59391	38	10.40609	9.96888	5	34
27	9.56311	32	9.59429	37	10.40571	9.96883	5	33
28	9.56343	32	9.59466	37	10.40534	9.96878	5	32
29	9.56375	33	9.59503	37	10.40497	9.96873	5	31
30	9.56408	32	9.59540	37	10.40460	9.96868	5	30
31	9.56440	32	9.59577	37	10.40423	9.96863	5	29
32	9.56472	32	9.59614	37	10.40386	9.96858	5	28
33	9.56504	32	9.59651	37	10.40349	9.96853	5	27
34	9.56536	32	9.59688	37	10.40312	9.96848	5	26
35	9.56568	31	9.59725	37	10.40275	9.96843	5	25
36	9.56599	32	9.59762	37	10.40238	9.96838	5	24
37	9.56631	32	9.59799	36	10.40201	9.96833	5	23
38	9.56663	32	9.59835	37	10.40165	9.96828	5	22
39	9.56695	32	9.59872	37	10.40128	9.96823	5	21
40	9.56727	32	9.59909	37	10.40091	9.96818	5	20
41	9.56759	31	9.59946	37	10.40054	9.96813	5	19
42	9.56790	32	9.59983	36	10.40017	9.96808	5	18
43	9.56822	32	9.60019	37	10.39981	9.96803	5	17
44	9.56854	32	9.60056	37	10.39944	9.96798	5	16
45	9.56886	31	9.60093	37	10.39907	9.96793	5	15
46	9.56917	32	9.60130	36	10.39870	9.96788	5	14
47	9.56949	31	9.60166	37	10.39834	9.96783	5	13
48	9.56980	32	9.60203	37	10.39797	9.96778	6	12
49	9.57012	32	9.60240	36	10.39760	9.96772	5	11
50	9.57044	31	9.60276	37	10.39724	9.96767	5	10
51	9.57075	32	9.60313	36	10.39687	9.96762	5	9
52	9.57107	31	9.60349	37	10.39651	9.96757	5	8
53	9.57138	31	9.60386	36	10.39614	9.96752	5	7
54	9.57169	32	9.60422	37	10.39578	9.96747	5	6
55	9.57201	31	9.60459	36	10.39541	9.96742	5	5
56	9.57232	32	9.60495	37	10.39505	9.96737	5	4
57	9.57264	31	9.60532	36	10.39468	9.96732	5	3
58	9.57295	31	9.60568	37	10.39432	9.96727	5	2
59	9.57326	32	9.60605	36	10.39395	9.96722	5	1
60	9.57358		9.60641		10.39359	9.96717		0
	Coſ.		Cot.		Tang.	Sin.		

68 Degrees.

22 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Cos.	D.	′
0	9.57358	31	9.60641	36	10.39359	9.96717	6	60
1	9.57389	31	9.60677	37	10.39323	9.96711	5	59
2	9.57420	31	9.60714	36	10.39286	9.96706	5	58
3	9.57451	31	9.60750	36	10.39250	9.96701	5	57
4	9.57482	32	9.60786	37	10.39214	9.96696	5	56
5	9.57514	31	9.60823	36	10.39177	9.96691	5	55
6	9.57545	31	9.60859	36	10.39141	9.96686	5	54
7	9.57576	31	9.60895	36	10.39105	9.96681	5	53
8	9.57607	31	9.60931	36	10.39069	9.96676	6	52
9	9.57638	31	9.60967	37	10.39033	9.96670	5	51
10	9.57669	31	9.61004	36	10.38996	9.96665	5	50
11	9.57700	31	9.61040	36	10.38960	9.96660	5	49
12	9.57731	31	9.61076	36	10.38924	9.96655	5	48
13	9.57762	31	9.61112	36	10.38888	9.96650	5	47
14	9.57793	31	9.61148	36	10.38852	9.96645	5	46
15	9.57824	31	9.61184	36	10.38816	9.96640	6	45
16	9.57855	30	9.61220	36	10.38780	9.96634	5	44
17	9.57885	31	9.61256	36	10.38744	9.96629	5	43
18	9.57916	31	9.61292	36	10.38708	9.96624	5	42
19	9.57947	31	9.61328	36	10.38672	9.96619	5	41
20	9.57978	30	9.61364	36	10.38636	9.96614	6	40
21	9.58008	31	9.61400	36	10.38600	9.96608	5	39
22	9.58039	31	9.61436	36	10.38564	9.96603	5	38
23	9.58070	31	9.61472	36	10.38528	9.96598	5	37
24	9.58101	30	9.61508	36	10.38492	9.96593	5	36
25	9.58131	31	9.61544	35	10.38456	9.96588	6	35
26	9.58162	30	9.61579	36	10.38421	9.96582	5	34
27	9.58192	31	9.61615	36	10.3838	9.96577	5	33
28	9.58223	30	9.61651	36	10.38349	9.96572	5	32
29	9.58253	31	9.61687	35	10.38313	9.96567	5	31
30	9.58284	30	9.61722	36	10.38278	9.96562	6	30
31	9.58314	31	9.61758	36	10.38242	9.96556	5	29
32	9.58345	30	9.61794	36	10.38206	9.96551	5	28
33	9.58375	31	9.61830	35	10.38170	9.96546	5	27
34	9.58406	30	9.61865	36	10.38135	9.96541	6	26
35	9.58436	31	9.61901	35	10.38099	9.96535	5	25
36	9.58467	30	9.61936	36	10.38064	9.96530	5	24
37	9.58497	30	9.61972	36	10.38028	9.96525	5	23
38	9.58527	30	9.62008	35	10.37992	9.96520	6	22
39	9.58557	31	9.62043	36	10.37957	9.96514	5	21
40	9.58588	30	9.62079	35	10.37921	9.96509	5	20
41	9.58618	30	9.62114	36	10.37886	9.96504	6	19
42	9.58648	30	9.62150	35	10.37850	9.96498	5	18
43	9.58678	31	9.62185	36	10.37815	9.96493	5	17
44	9.58709	30	9.62221	35	10.37779	9.96488	5	16
45	9.58739	30	9.62256	36	10.37744	9.96483	6	15
46	9.58769	30	9.62292	35	10.37708	9.96477	5	14
47	9.58799	30	9.62327	35	10.37673	9.96472	5	13
48	9.58829	30	9.62362	36	10.37638	9.96467	6	12
49	9.58859	30	9.62398	35	10.37602	9.96461	5	11
50	9.58889	30	9.62433	35	10.37567	9.96456	5	10
51	9.58919	30	9.62468	36	10.37532	9.96451	6	9
52	9.58949	30	9.62504	35	10.37496	9.96445	5	8
53	9.58979	30	9.62539	35	10.37461	9.96440	5	7
54	9.59009	30	9.62574	35	10.37426	9.96435	6	6
55	9.59039	30	9.62609	36	10.37391	9.96429	5	5
56	9.59069	29	9.62645	35	10.37355	9.96424	5	4
57	9.59098	30	9.62680	35	10.37320	9.96419	6	3
58	9.59128	30	9.62715	35	10.37285	9.96413	5	2
59	9.59158	30	9.62750	35	10.37250	9.96408	5	1
60	9.59188		9.62785		10.37215	9.96403		0
	Cos.		Cot.		Tang.	Sin.		

67 Degrees.

23 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Cos.	D.	′
0	9.59188	30	9.62785	35	10.37215	9.96403	6	60
1	9.59218	29	9.62820	35	10.37180	9.96397	5	59
2	9.59247	30	9.62855	35	10.37145	9.96392	5	58
3	9.59277	30	9.62890	36	10.37110	9.96387	6	57
4	9.59307	29	9.62926	35	10.37074	9.96381	5	56
5	9.59336	30	9.62961	35	10.37039	9.96376	6	55
6	9.59366	30	9.62996	35	10.37004	9.96370	5	54
7	9.59396	29	9.63031	35	10.36969	9.96365	5	53
8	9.59425	30	9.63066	35	10.36934	9.96360	6	52
9	9.59455	29	9.63101	34	10.36899	9.96354	5	51
10	9.59484	30	9.63135	35	10.36865	9.96349	6	50
11	9.59514	29	9.63170	35	10.36830	9.96343	5	49
12	9.59543	30	9.63205	35	10.36795	9.96338	5	48
13	9.59573	29	9.63240	35	10.36760	9.96333	6	47
14	9.59602	30	9.63275	35	10.36725	9.96327	5	46
15	9.59632	29	9.63310	35	10.36690	9.96322	6	45
16	9.59661	29	9.63345	34	10.36655	9.96316	5	44
17	9.59690	30	9.63379	35	10.36621	9.96311	6	43
18	9.59720	29	9.63414	35	10.36586	9.96305	5	42
19	9.59749	29	9.63449	35	10.36551	9.96300	6	41
20	9.59778	30	9.63484	35	10.36516	9.96294	5	40
21	9.59808	29	9.63519	34	10.36481	9.96289	5	39
22	9.59837	29	9.63553	35	10.36447	9.96284	6	38
23	9.59866	29	9.63588	35	10.36412	9.96278	5	37
24	9.59895	29	9.63623	34	10.36377	9.96273	6	36
25	9.59924	30	9.63657	35	10.36343	9.96267	5	35
26	9.59954	29	9.63692	34	10.36308	9.96262	6	34
27	9.59983	29	9.63726	35	10.36274	9.96256	5	33
28	9.60012	29	9.63761	35	10.36239	9.96251	6	32
29	9.60041	29	9.63796	34	10.36204	9.96245	5	31
30	9.60070	29	9.63830	35	10.36170	9.96240	6	30
31	9.60099	29	9.63865	34	10.36135	9.96234	5	29
32	9.60128	29	9.63899	35	10.36101	9.96229	6	28
33	9.60157	29	9.63934	34	10.36066	9.96223	5	27
34	9.60186	29	9.63968	35	10.36032	9.96218	6	26
35	9.60215	29	9.64003	34	10.35997	9.96212	5	25
36	9.60244	29	9.64037	35	10.35963	9.96207	6	24
37	9.60273	29	9.64072	34	10.35928	9.96201	5	23
38	9.60302	29	9.64106	34	10.35894	9.96196	6	22
39	9.60331	28	9.64140	35	10.35860	9.96190	5	21
40	9.60359	29	9.64175	34	10.35825	9.96185	6	20
41	9.60388	29	9.64209	34	10.35791	9.96179	5	19
42	9.60417	29	9.64243	35	10.35757	9.96174	6	18
43	9.60446	28	9.64278	34	10.35722	9.96168	6	17
44	9.60474	29	9.64312	34	10.35688	9.96162	5	16
45	9.60503	29	9.64346	35	10.35654	9.96157	6	15
46	9.60532	29	9.64381	34	10.35619	9.96151	5	14
47	9.60561	28	9.64415	34	10.35585	9.96146	6	13
48	9.60589	29	9.64449	34	10.35551	9.96140	5	12
49	9.60618	28	9.64483	34	10.35517	9.96135	6	11
50	9.60646	29	9.64517	35	10.35483	9.96129	6	10
51	9.60675	29	9.64552	34	10.35448	9.96123	5	9
52	9.60704	28	9.64586	34	10.35414	9.96118	6	8
53	9.60732	29	9.64620	34	10.35380	9.96112	5	7
54	9.60761	28	9.64654	34	10.35346	9.96107	6	6
55	9.60789	29	9.64688	34	10.35312	9.96101	6	5
56	9.60818	28	9.64722	34	10.35278	9.96095	5	4
57	9.60846	29	9.64756	34	10.35244	9.96090	6	3
58	9.60875	28	9.64790	34	10.35210	9.96084	5	2
59	9.60903	28	9.64824	34	10.35176	9.96079	6	1
60	9.60931		9.64858		10.35142	9.96073		0
	Cos.		Cot.		Tang.	Sin.		

66 Degrees.

LOGARITHMIC SINES AND TANGENTS.

24 Degrees.

'	Sin.	D.	Tang.	D.	Cot.	Cos.	D.	'
0	9.60931	29	9.64858	34	10.35142	9.96073	6	60
1	9.60960	28	9.64892	34	10.35108	9.96067	5	59
2	9.60988	28	9.64926	34	10.35074	9.96062	6	58
3	9.61016	29	9.64960	34	10.35040	9.96056	6	57
4	9.61045	28	9.64994	34	10.35006	9.96050	5	56
5	9.61073	28	9.65028	34	10.34972	9.96045	6	55
6	9.61101	28	9.65062	34	10.34938	9.96039	5	54
7	9.61129	29	9.65096	34	10.34904	9.96034	6	53
8	9.61158	28	9.65130	34	10.34870	9.96028	6	52
9	9.61186	28	9.65164	33	10.34836	9.96022	5	51
10	9.61214	28	9.65197	34	10.34803	9.96017	6	50
11	9.61242	28	9.65231	34	10.34769	9.96011	6	49
12	9.61270	28	9.65265	34	10.34735	9.96005	5	48
13	9.61298	28	9.65299	34	10.34701	9.96000	6	47
14	9.61326	28	9.65333	33	10.34667	9.95994	6	46
15	9.61354	28	9.65366	34	10.34634	9.95988	6	45
16	9.61382	29	9.65400	34	10.34600	9.95982	5	44
17	9.61411	27	9.65434	33	10.34566	9.95977	6	43
18	9.61438	28	9.65467	34	10.34533	9.95971	6	42
19	9.61466	28	9.65501	34	10.34499	9.95965	5	41
20	9.61494	28	9.65535	33	10.34465	9.95960	6	40
21	9.61522	28	9.65568	34	10.34432	9.95954	6	39
22	9.61550	28	9.65602	34	10.34398	9.95948	6	38
23	9.61578	28	9.65636	33	10.34364	9.95942	5	37
24	9.61606	28	9.65669	34	10.34331	9.95937	6	36
25	9.61634	28	9.65703	33	10.34297	9.95931	6	35
26	9.61662	27	9.65736	34	10.34264	9.95925	5	34
27	9.61689	28	9.65770	33	10.34230	9.95920	6	33
28	9.61717	28	9.65803	34	10.34197	9.95914	6	32
29	9.61745	28	9.65837	33	10.34163	9.95908	6	31
30	9.61773	27	9.65870	34	10.34130	9.95902	5	30
31	9.61800	28	9.65904	33	10.34096	9.95897	6	29
32	9.61828	28	9.65937	34	10.34063	9.95891	6	28
33	9.61856	27	9.65971	33	10.34029	9.95885	6	27
34	9.61883	28	9.66004	34	10.33996	9.95879	6	26
35	9.61911	28	9.66038	33	10.33962	9.95873	5	25
36	9.61939	27	9.66071	33	10.33929	9.95868	6	24
37	9.61966	28	9.66104	34	10.33896	9.95862	6	23
38	9.61994	27	9.66138	33	10.33862	9.95856	6	22
39	9.62021	28	9.66171	33	10.33829	9.95850	6	21
40	9.62049	27	9.66204	34	10.33796	9.95844	5	20
41	9.62076	28	9.66238	33	10.33762	9.95839	6	19
42	9.62104	27	9.66271	33	10.33729	9.95833	6	18
43	9.62131	28	9.66304	33	10.33696	9.95827	6	17
44	9.62159	27	9.66337	34	10.33663	9.95821	6	16
45	9.62186	28	9.66371	33	10.33629	9.95815	5	15
46	9.62214	27	9.66404	33	10.33596	9.95810	6	14
47	9.62241	27	9.66437	33	10.33563	9.95804	6	13
48	9.62268	28	9.66470	33	10.33530	9.95798	6	12
49	9.62296	27	9.66503	34	10.33497	9.95792	6	11
50	9.62323	27	9.66537	33	10.33463	9.95786	6	10
51	9.62350	27	9.66570	33	10.33430	9.95780	5	9
52	9.62377	28	9.66603	33	10.33397	9.95775	6	8
53	9.62405	27	9.66636	33	10.33364	9.95769	6	7
54	9.62432	27	9.66669	33	10.33331	9.95763	6	6
55	9.62459	27	9.66702	33	10.33298	9.95757	6	5
56	9.62486	27	9.66735	33	10.33265	9.95751	6	4
57	9.62513	28	9.66768	33	10.33232	9.95745	6	3
58	9.62541	27	9.66801	33	10.33199	9.95739	6	2
59	9.62568	27	9.66834	33	10.33166	9.95733	5	1
60	9.62595		9.66867		10.33133	9.95728		0
	Cos.		Cot.		Tang.	Sin.		

65 Degrees.

25 Degrees.

'	Sin.	D.	Tang.	D.	Cot.	Cos.	D.	'
0	9.62595	27	9.66867	33	10.33133	9.95728	6	60
1	9.62622	27	9.66900	33	10.33100	9.95722	6	59
2	9.62649	27	9.66933	33	10.33067	9.95716	6	58
3	9.62676	27	9.66966	33	10.33034	9.95710	6	57
4	9.62703	27	9.66999	33	10.33001	9.95704	6	56
5	9.62730	27	9.67032	33	10.32968	9.95698	6	55
6	9.62757	27	9.67065	33	10.32935	9.95692	6	54
7	9.62784	27	9.67098	33	10.32902	9.95686	6	53
8	9.62811	27	9.67131	32	10.32869	9.95680	6	52
9	9.62838	27	9.67163	33	10.32837	9.95674	6	51
10	9.62865	27	9.67196	33	10.32804	9.95668	5	50
11	9.62892	26	9.67229	33	10.32771	9.95663	6	49
12	9.62918	27	9.67262	33	10.32738	9.95657	6	48
13	9.62945	27	9.67295	32	10.32705	9.95651	6	47
14	9.62972	27	9.67327	33	10.32673	9.95645	6	46
15	9.62999	27	9.67360	33	10.32740	9.95639	6	45
16	9.63026	26	9.67393	33	10.32607	9.95633	6	44
17	9.63052	27	9.67426	32	10.32574	9.95627	6	43
18	9.63079	27	9.67458	33	10.32542	9.95621	6	42
19	9.63106	27	9.67491	33	10.32509	9.95615	6	41
20	9.63133	26	9.67524	32	10.32476	9.95609	6	40
21	9.63159	27	9.67556	33	10.32444	9.95603	6	39
22	9.63186	27	9.67589	33	10.32411	9.95597	6	38
23	9.63213	26	9.67622	32	10.32378	9.95591	6	37
24	9.63239	27	9.67654	33	10.32346	9.95585	6	36
25	9.63266	26	9.67687	32	10.32313	9.95579	6	35
26	9.63292	27	9.67719	33	10.32281	9.95573	6	34
27	9.63319	26	9.67752	33	10.32248	9.95567	6	33
28	9.63345	27	9.67785	32	10.32215	9.95561	6	32
29	9.63372	26	9.67817	33	10.32183	9.95555	6	31
30	9.63398	27	9.67850	32	10.32150	9.95549	6	30
31	9.63425	26	9.67882	33	10.32118	9.95543	6	29
32	9.63451	27	9.67915	32	10.32085	9.95537	6	28
33	9.63478	26	9.67947	33	10.32053	9.95531	6	27
34	9.63504	27	9.67980	32	10.32020	9.95525	6	26
35	9.63531	26	9.68012	32	10.31988	9.95519	6	25
36	9.63557	26	9.68044	33	10.31956	9.95513	6	24
37	9.63583	27	9.68077	32	10.31923	9.95507	7	23
38	9.63610	26	9.68109	33	10.31891	9.95500	6	22
39	9.63636	26	9.68142	32	10.31858	9.95494	6	21
40	9.63662	27	9.68174	32	10.31826	9.95488	6	20
41	9.63689	26	9.68206	33	10.31794	9.95482	6	19
42	9.63715	26	9.68239	32	10.31761	9.95476	6	18
43	9.63741	26	9.68271	32	10.31729	9.95470	6	17
44	9.63767	27	9.68303	33	10.31697	9.95464	6	16
45	9.63794	26	9.68336	32	10.31664	9.95458	6	15
46	9.63820	26	9.68368	32	10.31632	9.95452	6	14
47	9.63846	26	9.68400	32	10.31600	9.95446	6	13
48	9.63872	26	9.68432	33	10.31568	9.95440	6	12
49	9.63898	26	9.68465	32	10.31535	9.95434	7	11
50	9.63924	26	9.68497	32	10.31503	9.95427	6	10
51	9.63950	26	9.68529	32	10.31471	9.95421	6	9
52	9.63976	26	9.68561	32	10.31439	9.95415	6	8
53	9.64002	26	9.68593	33	10.31407	9.95409	6	7
54	9.64028	26	9.68626	32	10.31374	9.95403	6	6
55	9.64054	26	9.68658	32	10.31342	9.95397	6	5
56	9.64080	26	9.68690	32	10.31310	9.95391	7	4
57	9.64106	26	9.68722	32	10.31278	9.95384	6	3
58	9.64132	26	9.68754	32	10.31246	9.95378	6	2
59	9.64158	26	9.68786	32	10.31214	9.95372	6	1
60	9.64184		9.68818		10.31182	9.95366		0
	Cos.		Cot.		Tang.	Sin.		

64 Degrees.

26 Degrees.

	Sin.	D.	Tang.	D.	Cot.	Cos.	D.	
0	9.64184	26	9.68818	32	10.31182	9.95366	6	60
1	9.64210	26	9.68850	32	10.31150	9.95360	6	59
2	9.64236	26	9.68882	32	10.31118	9.95354	7	58
3	9.64262	26	9.68914	32	10.31086	9.95347	6	57
4	9.64288	25	9.68946	32	10.31054	9.95341	6	56
5	9.64313	26	9.68978	32	10.31022	9.95335	6	55
6	9.64339	26	9.69010	32	10.30990	9.95329	6	54
7	9.64365	26	9.69042	32	10.30958	9.95323	6	53
8	9.64391	26	9.69074	32	10.30926	9.95317	7	52
9	9.64417	25	9.69106	32	10.30894	9.95310	6	51
10	9.64442	26	9.69138	32	10.30862	9.95304	6	50
11	9.64468	26	9.69170	32	10.30830	9.95298	6	49
12	9.64494	25	9.69202	32	10.30798	9.95292	6	48
13	9.64519	26	9.69234	32	10.30766	9.95286	7	47
14	9.64545	26	9.69266	32	10.30734	9.95279	6	46
15	9.64571	25	9.69298	31	10.30702	9.95273	6	45
16	9.64596	26	9.69329	32	10.30671	9.95267	6	44
17	9.64622	25	9.69361	32	10.30639	9.95261	7	43
18	9.64647	26	9.69393	32	10.30607	9.95254	6	42
19	9.64673	25	9.69425	32	10.30575	9.95248	6	41
20	9.64698	26	9.69457	31	10.30543	9.95242	6	40
21	9.64724	25	9.69488	32	10.30512	9.95236	7	39
22	9.64749	26	9.69520	32	10.30480	9.95229	6	38
23	9.64775	25	9.69552	32	10.30448	9.95223	6	37
24	9.64800	26	9.69584	31	10.30416	9.95217	6	36
25	9.64826	25	9.69615	32	10.30385	9.95211	7	35
26	9.64851	26	9.69647	32	10.30353	9.95204	6	34
27	9.64877	25	9.69679	31	10.30321	9.95198	6	33
28	9.64902	25	9.69710	32	10.30290	9.95192	7	32
29	9.64927	26	9.69742	32	10.30258	9.95185	6	31
30	9.64953	25	9.69774	31	10.30226	9.95179	6	30
31	9.64978	25	9.69805	32	10.30195	9.95173	6	29
32	9.65003	26	9.69837	31	10.30163	9.95167	7	28
33	9.65029	25	9.69868	32	10.30132	9.95160	6	27
34	9.65054	25	9.69900	32	10.30100	9.95154	6	26
35	9.65079	25	9.69932	31	10.30068	9.95148	7	25
36	9.65104	26	9.69963	32	10.30037	9.95141	6	24
37	9.65130	25	9.69995	31	10.30005	9.95135	6	23
38	9.65155	25	9.70026	32	10.29974	9.95129	7	22
39	9.65180	25	9.70058	31	10.29942	9.95122	6	21
40	9.65205	25	9.70089	32	10.29911	9.95116	6	20
41	9.65230	25	9.70121	31	10.29879	9.95110	7	19
42	9.65255	26	9.70152	32	10.29848	9.95103	6	18
43	9.65281	25	9.70184	31	10.29816	9.95097	7	17
44	9.65306	25	9.70215	32	10.29785	9.95090	6	16
45	9.65331	25	9.70247	31	10.29753	9.95084	6	15
46	9.65356	25	9.70278	31	10.29722	9.95078	7	14
47	9.65381	25	9.70309	32	10.29691	9.95071	6	13
48	9.65406	25	9.70341	31	10.29659	9.95065	6	12
49	9.65431	25	9.70372	32	10.29628	9.95059	7	11
50	9.65456	25	9.70404	31	10.29596	9.95052	6	10
51	9.65481	25	9.70435	31	10.29565	9.95046	7	9
52	9.65506	25	9.70466	32	10.29534	9.95039	6	8
53	9.65531	25	9.70498	31	10.29502	9.95033	6	7
54	9.65556	24	9.70529	31	10.29471	9.95027	7	6
55	9.65580	25	9.70560	32	10.29440	9.95020	6	5
56	9.65605	25	9.70592	31	10.29408	9.95014	7	4
57	9.65630	25	9.70623	31	10.29377	9.95007	6	3
58	9.65655	25	9.70654	31	10.29346	9.95001	6	2
59	9.65680	25	9.70685	32	10.29315	9.94995	7	1
60	9.65705		9.70717		10.29283	9.94988		0
	Cos.		Cot.		Tang.	Sin.		

63 Degrees.

27 Degrees.

	Sin.	D.	Tang.	D.	Cot.	Cos.	D.	
0	9.65705	24	9.70717	31	10.29283	9.94988	6	60
1	9.65729	25	9.70748	31	10.29252	9.94982	7	59
2	9.65754	25	9.70779	31	10.29221	9.94975	6	58
3	9.65779	25	9.70810	31	10.29190	9.94969	7	57
4	9.65804	24	9.70841	32	10.29159	9.94962	6	56
5	9.65828	25	9.70873	31	10.29127	9.94956	7	55
6	9.65853	25	9.70904	31	10.29096	9.94949	6	54
7	9.65878	24	9.70935	31	10.29065	9.94943	7	53
8	9.65902	25	9.70966	31	10.29034	9.94936	6	52
9	9.65927	25	9.70997	31	10.29003	9.94930	7	51
10	9.65952	24	9.71028	31	10.28972	9.94923	6	50
11	9.65976	25	9.71059	31	10.28941	9.94917	6	49
12	9.66001	24	9.71090	31	10.28910	9.94911	7	48
13	9.66025	25	9.71121	32	10.28879	9.94904	6	47
14	9.66050	25	9.71153	31	10.28847	9.94898	7	46
15	9.66075	24	9.71184	31	10.28816	9.94891	6	45
16	9.66099	25	9.71215	31	10.28785	9.94885	7	44
17	9.66124	24	9.71246	31	10.28754	9.94878	7	43
18	9.66148	25	9.71277	31	10.28723	9.94871	6	42
19	9.66173	24	9.71308	31	10.28692	9.94865	7	41
20	9.66197	24	9.71339	31	10.28661	9.94858	6	40
21	9.66221	25	9.71370	31	10.28630	9.94852	7	39
22	9.66246	24	9.71401	30	10.28599	9.94845	6	38
23	9.66270	25	9.71431	31	10.28569	9.94839	7	37
24	9.66295	24	9.71462	31	10.28538	9.94832	6	36
25	9.66319	24	9.71493	31	10.28507	9.94826	7	35
26	9.66343	25	9.71524	31	10.28476	9.94819	6	34
27	9.66368	24	9.71555	31	10.28445	9.94813	7	33
28	9.66392	24	9.71586	31	10.28414	9.94806	7	32
29	9.66416	25	9.71617	31	10.28383	9.94799	6	31
30	9.66441	24	9.71648	31	10.28352	9.94793	7	30
31	9.66465	24	9.71679	30	10.28321	9.94786	6	29
32	9.66489	24	9.71709	31	10.28291	9.94780	7	28
33	9.66513	24	9.71740	31	10.28260	9.94773	6	27
34	9.66537	25	9.71771	31	10.28229	9.94767	7	26
35	9.66562	24	9.71802	31	10.28198	9.94760	7	25
36	9.66586	24	9.71833	30	10.28167	9.94753	6	24
37	9.66610	24	9.71863	31	10.28137	9.94747	7	23
38	9.66634	24	9.71894	31	10.28106	9.94740	6	22
39	9.66658	24	9.71925	30	10.28075	9.94734	7	21
40	9.66682	24	9.71955	31	10.28045	9.94727	7	20
41	9.66706	25	9.71986	31	10.28014	9.94720	6	19
42	9.66731	24	9.72017	31	10.27983	9.94714	7	18
43	9.66755	24	9.72048	30	10.27952	9.94707	7	17
44	9.66779	24	9.72078	31	10.27922	9.94700	6	16
45	9.66803	24	9.72109	31	10.27891	9.94694	7	15
46	9.66827	24	9.72140	30	10.27860	9.94687	7	14
47	9.66851	24	9.72170	31	10.27830	9.94680	6	13
48	9.66875	24	9.72201	30	10.27799	9.94674	7	12
49	9.66899	23	9.72231	31	10.27769	9.94667	7	11
50	9.66922	24	9.72262	31	10.27738	9.94660	6	10
51	9.66946	24	9.72293	30	10.27707	9.94654	7	9
52	9.66970	24	9.72323	31	10.27677	9.94647	7	8
53	9.66994	24	9.72354	30	10.27646	9.94640	6	7
54	9.67018	24	9.72384	31	10.27616	9.94634	7	6
55	9.67042	24	9.72415	30	10.27585	9.94627	7	5
56	9.67066	24	9.72445	31	10.27555	9.94620	6	4
57	9.67090	23	9.72476	30	10.27524	9.94614	7	3
58	9.67113	24	9.72506	31	10.27494	9.94607	7	2
59	9.67137	24	9.72537	30	10.27463	9.94600	7	1
60	9.67161		9.72567		10.27433	9.94593		0
	Cos.		Cot.		Tang.	Sin.		

62 Degrees.

28 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Coſ.	D.	′
0	9.67161	24	9.72567	31	10.27433	9.94593	6	60
1	9.67185	23	9.72598	30	10.27402	9.94587	7	59
2	9.67208	24	9.72628	31	10.27372	9.94580	7	58
3	9.67232	24	9.72659	30	10.27341	9.94573	6	57
4	9.67256	24	9.72689	31	10.27311	9.94567	7	56
5	9.67280	23	9.72720	30	10.27280	9.94560	7	55
6	9.67303	24	9.72750	30	10.27250	9.94553	7	54
7	9.67327	23	9.72780	31	10.27220	9.94546	6	53
8	9.67350	24	9.72811	30	10.27189	9.94540	7	52
9	9.67374	24	9.72841	31	10.27159	9.94533	7	51
10	9.67398	23	9.72872	30	10.27128	9.94526	7	50
11	9.67421	24	9.72902	30	10.27098	9.94519	6	49
12	9.67445	23	9.72932	31	10.27068	9.94513	7	48
13	9.67468	24	9.72963	30	10.27037	9.94506	7	47
14	9.67492	23	9.72993	30	10.27007	9.94499	7	46
15	9.67515	24	9.73023	31	10.26977	9.94492	7	45
16	9.67539	23	9.73054	30	10.26946	9.94485	6	44
17	9.67562	24	9.73084	30	10.26916	9.94479	7	43
18	9.67586	23	9.73114	30	10.26886	9.94472	7	42
19	9.67609	24	9.73144	31	10.26856	9.94465	7	41
20	9.67633	23	9.73175	30	10.26825	9.94458	7	40
21	9.67656	24	9.73205	30	10.26795	9.94451	6	39
22	9.67680	23	9.73235	30	10.26765	9.94445	7	38
23	9.67703	23	9.73265	30	10.26735	9.94438	7	37
24	9.67726	24	9.73295	31	10.26705	9.94431	7	36
25	9.67750	23	9.73326	30	10.26674	9.94424	7	35
26	9.67773	23	9.73356	30	10.26644	9.94417	7	34
27	9.67796	24	9.73386	30	10.26614	9.94410	6	33
28	9.67820	23	9.73416	30	10.26584	9.94404	7	32
29	9.67843	23	9.73446	30	10.26554	9.94397	7	31
30	9.67866	24	9.73476	31	10.26524	9.94390	7	30
31	9.67890	23	9.73507	30	10.26493	9.94383	7	29
32	9.67913	23	9.73537	30	10.26463	9.94376	7	28
33	9.67936	23	9.73567	30	10.26433	9.94369	7	27
34	9.67959	23	9.73597	30	10.26403	9.94362	7	26
35	9.67982	24	9.73627	30	10.26373	9.94355	6	25
36	9.68006	23	9.73657	30	10.26343	9.94349	7	24
37	9.68029	23	9.73687	30	10.26313	9.94342	7	23
38	9.68052	23	9.73717	30	10.26283	9.94335	7	22
39	9.68075	23	9.73747	30	10.26253	9.94328	7	21
40	9.68098	23	9.73777	30	10.26223	9.94321	7	20
41	9.68121	23	9.73807	30	10.26193	9.94314	7	19
42	9.68144	23	9.73837	30	10.26163	9.94307	7	18
43	9.68167	23	9.73867	30	10.26133	9.94300	7	17
44	9.68190	23	9.73897	30	10.26103	9.94293	7	16
45	9.68213	24	9.73927	30	10.26073	9.94286	7	15
46	9.68237	23	9.73957	30	10.26043	9.94279	6	14
47	9.68260	23	9.73987	30	10.26013	9.94273	7	13
48	9.68283	22	9.74017	30	10.25983	9.94266	7	12
49	9.68305	23	9.74047	30	10.25953	9.94259	7	11
50	9.68328	23	9.74077	30	10.25923	9.94252	7	10
51	9.68351	23	9.74107	30	10.25893	9.94245	7	9
52	9.68374	23	9.74137	29	10.25863	9.94238	7	8
53	9.68397	23	9.74166	30	10.25834	9.94231	7	7
54	9.68420	23	9.74196	30	10.25804	9.94224	7	6
55	9.68443	23	9.74226	30	10.25774	9.94217	7	5
56	9.68466	23	9.74256	30	10.25744	9.94210	7	4
57	9.68489	23	9.74286	30	10.25714	9.94203	7	3
58	9.68512	22	9.74316	29	10.25684	9.94196	7	2
59	9.68534	23	9.74345	30	10.25655	9.94189	7	1
60	9.68557		9.74375		10.25625	9.94182		0
	Coſ.		Cot.		Tang.	Sin.		

29 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Coſ.	D.	′
0	9.68557	23	9.74375	30	10.25625	9.94182	7	60
1	9.68580	23	9.74405	30	10.25595	9.94175	7	59
2	9.68603	22	9.74435	30	10.25565	9.94168	7	58
3	9.68625	23	9.74465	29	10.25535	9.94161	7	57
4	9.68648	23	9.74494	30	10.25506	9.94154	7	56
5	9.68671	23	9.74524	30	10.25476	9.94147	7	55
6	9.68694	22	9.74554	29	10.25446	9.94140	7	54
7	9.68716	23	9.74583	30	10.25417	9.94133	7	53
8	9.68739	23	9.74613	30	10.25387	9.94126	7	52
9	9.68762	22	9.74643	30	10.25357	9.94119	7	51
10	9.68784	23	9.74673	29	10.25327	9.94112	7	50
11	9.68807	22	9.74702	30	10.25298	9.94105	7	49
12	9.68829	23	9.74732	30	10.25268	9.94098	8	48
13	9.68852	23	9.74762	29	10.25238	9.94090	7	47
14	9.68875	22	9.74791	30	10.25209	9.94083	7	46
15	9.68897	23	9.74821	30	10.25179	9.94076	7	45
16	9.68920	22	9.74851	29	10.25149	9.94069	7	44
17	9.68942	23	9.74880	30	10.25120	9.94062	7	43
18	9.68965	22	9.74910	29	10.25090	9.94055	7	42
19	9.68987	23	9.74939	30	10.25061	9.94048	7	41
20	9.69010	22	9.74969	29	10.25031	9.94041	7	40
21	9.69032	23	9.74998	30	10.25002	9.94034	7	39
22	9.69055	22	9.75028	30	10.24972	9.94027	7	38
23	9.69077	23	9.75058	29	10.24942	9.94020	8	37
24	9.69100	22	9.75087	30	10.24913	9.94012	7	36
25	9.69122	22	9.75117	29	10.24883	9.94005	7	35
26	9.69144	23	9.75146	30	10.24854	9.93998	7	34
27	9.69167	22	9.75176	29	10.24824	9.93991	7	33
28	9.69189	23	9.75205	30	10.24795	9.93984	7	32
29	9.69212	22	9.75235	29	10.24765	9.93977	7	31
30	9.69234	22	9.75264	30	10.24736	9.93970	7	30
31	9.69256	23	9.75294	29	10.24706	9.93963	8	29
32	9.69279	22	9.75323	30	10.24677	9.93955	7	28
33	9.69301	22	9.75353	29	10.24647	9.93948	7	27
34	9.69323	22	9.75382	29	10.24618	9.93941	7	26
35	9.69345	23	9.75411	30	10.24589	9.93934	7	25
36	9.69368	22	9.75441	29	10.24559	9.93927	7	24
37	9.69390	22	9.75470	30	10.24530	9.93920	8	23
38	9.69412	22	9.75500	29	10.24500	9.93912	7	22
39	9.69434	22	9.75529	29	10.24471	9.93905	7	21
40	9.69456	23	9.75558	30	10.24442	9.93898	7	20
41	9.69479	22	9.75588	29	10.24412	9.93891	7	19
42	9.69501	22	9.75617	30	10.24383	9.93884	8	18
43	9.69523	22	9.75647	29	10.24353	9.93876	7	17
44	9.69545	22	9.75676	29	10.24324	9.93869	7	16
45	9.69567	22	9.75705	30	10.24295	9.93862	7	15
46	9.69589	22	9.75735	29	10.24265	9.93855	8	14
47	9.69611	22	9.75764	29	10.24236	9.93847	7	13
48	9.69633	22	9.75793	29	10.24207	9.93840	7	12
49	9.69655	22	9.75822	30	10.24178	9.93833	7	11
50	9.69677	22	9.75852	29	10.24148	9.93826	7	10
51	9.69699	22	9.75881	29	10.24119	9.93819	8	9
52	9.69721	22	9.75910	29	10.24090	9.93811	7	8
53	9.69743	22	9.75939	30	10.24061	9.93804	7	7
54	9.69765	22	9.75969	29	10.24031	9.93797	8	6
55	9.69787	22	9.75998	29	10.24002	9.93789	7	5
56	9.69809	22	9.76027	29	10.23973	9.93782	7	4
57	9.69831	22	9.76056	30	10.23944	9.93775	7	3
58	9.69853	22	9.76086	29	10.23914	9.93768	8	2
59	9.69875	22	9.76115	29	10.23885	9.93760	7	1
60	9.69897		9.76144		10.23856	9.93753		0
	Coſ.		Cot.		Tang.	Sin.		

60 Degrees.

30 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Coſ.	D.	′
0	9.69897	22	9.76144	29	10.23856	9.93753	7	60
1	9.69919	22	9.76173	29	10.23827	9.93746	8	59
2	9.69941	22	9.76202	29	10.23798	9.93738	7	58
3	9.69963	21	9.76231	30	10.23769	9.93731	7	57
4	9.69984	22	9.76261	29	10.23739	9.93724	7	56
5	9.70006	22	9.76290	29	10.23710	9.93717	8	55
6	9.70028	22	9.76319	29	10.23681	9.93709	7	54
7	9.70050	22	9.76348	29	10.23652	9.93702	7	53
8	9.70072	21	9.76377	29	10.23623	9.93695	8	52
9	9.70093	22	9.76406	29	10.23594	9.93687	7	51
10	9.70115	22	9.76435	29	10.23565	9.93680	7	50
11	9.70137	22	9.76464	29	10.23536	9.93673	8	49
12	9.70159	21	9.76493	29	10.23507	9.93665	7	48
13	9.70180	22	9.76522	29	10.23478	9.93658	8	47
14	9.70202	22	9.76551	29	10.23449	9.93650	7	46
15	9.70224	21	9.76580	29	10.23420	9.93643	7	45
16	9.70245	22	9.76609	30	10.23391	9.93636	8	44
17	9.70267	21	9.76639	29	10.23361	9.93628	7	43
18	9.70288	22	9.76668	29	10.23332	9.93621	7	42
19	9.70310	22	9.76697	28	10.23303	9.93614	8	41
20	9.70332	21	9.76725	29	10.23275	9.93606	7	40
21	9.70353	22	9.76754	29	10.23246	9.93599	8	39
22	9.70375	21	9.76783	29	10.23217	9.93591	7	38
23	9.70396	22	9.76812	29	10.23188	9.93584	7	37
24	9.70418	21	9.76841	29	10.23159	9.93577	8	36
25	9.70439	22	9.76870	29	10.23130	9.93569	7	35
26	9.70461	21	9.76899	29	10.23101	9.93562	8	34
27	9.70482	22	9.76928	29	10.23072	9.93554	7	33
28	9.70504	21	9.76957	29	10.23043	9.93547	8	32
29	9.70525	22	9.76986	29	10.23014	9.93539	7	31
30	9.70547	21	9.77015	29	10.22985	9.93532	7	30
31	9.70568	22	9.77044	29	10.22956	9.93525	8	29
32	9.70590	21	9.77073	28	10.22927	9.93517	7	28
33	9.70611	22	9.77101	29	10.22899	9.93510	8	27
34	9.70633	21	9.77130	29	10.22870	9.93502	7	26
35	9.70654	21	9.77159	29	10.22841	9.93495	8	25
36	9.70675	22	9.77188	29	10.22812	9.93487	7	24
37	9.70697	21	9.77217	29	10.22783	9.93480	8	23
38	9.70718	21	9.77246	28	10.22754	9.93472	7	22
39	9.70739	22	9.77274	29	10.22726	9.93465	8	21
40	9.70761	21	9.77303	29	10.22697	9.93457	7	20
41	9.70782	21	9.77332	29	10.22668	9.93450	8	19
42	9.70803	21	9.77361	29	10.22639	9.93442	7	18
43	9.70824	22	9.77390	28	10.22610	9.93435	8	17
44	9.70846	21	9.77418	29	10.22582	9.93427	7	16
45	9.70867	21	9.77447	29	10.22553	9.93420	8	15
46	9.70888	21	9.77476	29	10.22524	9.93412	7	14
47	9.70909	22	9.77505	28	10.22495	9.93405	8	13
48	9.70931	21	9.77533	29	10.22467	9.93397	7	12
49	9.70952	21	9.77562	29	10.22438	9.93390	8	11
50	9.70973	21	9.77591	28	10.22409	9.93382	7	10
51	9.70994	21	9.77619	29	10.22381	9.93375	8	9
52	9.71015	21	9.77648	29	10.22352	9.93367	7	8
53	9.71036	22	9.77977	29	10.22323	9.93360	8	7
54	9.71058	21	9.77706	28	10.22294	9.93352	8	6
55	9.71079	21	9.77734	29	10.22266	9.93344	7	5
56	9.71100	21	9.77763	28	10.22237	9.93337	8	4
57	9.71121	21	9.77791	29	10.22209	9.93329	7	3
58	9.71142	21	9.77820	29	10.22180	9.93322	8	2
59	9.71163	21	9.77849	28	10.22151	9.93314	7	1
60	9.71184		9.77877		10.22223	9.93307		0
	Coſ.		Cot.		Tang.	Sin.		

59 Degrees.

31 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Coſ.	D.	′
0	9.71184	21	9.77877	29	10.22123	9.93307	8	60
1	9.71205	21	9.77906	29	10.22094	9.93299	8	59
2	9.71226	21	9.77935	28	10.22065	9.93291	7	58
3	9.71247	21	9.77963	29	10.22037	9.93284	8	57
4	9.71268	21	9.77992	28	10.22008	9.93276	7	56
5	9.71289	21	9.78020	29	10.21980	9.93269	8	55
6	9.71310	21	9.78049	28	10.21951	9.93261	8	54
7	9.71331	21	9.78077	29	10.21923	9.93253	7	53
8	9.71352	21	9.78106	29	10.21894	9.93246	8	52
9	9.71373	20	9.78135	28	10.21865	9.93238	8	51
10	9.71393	21	9.78163	29	10.21837	9.93230	7	50
11	9.71414	21	9.78192	28	10.21808	9.93223	8	49
12	9.71435	21	9.78220	29	10.21780	9.93215	8	48
13	9.71456	21	9.78249	28	10.21751	9.93207	7	47
14	9.71477	21	9.78277	29	10.21723	9.93200	8	46
15	9.71498	21	9.78306	28	10.21694	9.93192	8	45
16	9.71519	20	9.78334	29	10.21666	9.93184	7	44
17	9.71539	21	9.78363	28	10.21637	9.93177	8	43
18	9.71560	21	9.78391	28	10.21609	9.93169	8	42
19	9.71581	21	9.78419	29	10.21581	9.93161	7	41
20	9.71602	20	9.78448	28	10.21552	9.93154	8	40
21	9.71622	21	9.78476	29	10.21524	9.93146	8	39
22	9.71643	21	9.78505	28	10.21495	9.93138	7	38
23	9.71664	21	9.78533	29	10.21467	9.93131	8	37
24	9.71685	20	9.78562	28	10.21438	9.93123	8	36
25	9.71705	21	9.78590	28	10.21410	9.93115	7	35
26	9.71726	21	9.78618	29	10.21382	9.93108	8	34
27	9.71747	20	9.78647	28	10.21353	9.93100	8	33
28	9.71767	21	9.78675	29	10.21325	9.93092	8	32
29	9.71788	21	9.78704	28	10.21296	9.93084	7	31
30	9.71809	20	9.78732	28	10.21268	9.93077	8	30
31	9.71829	21	9.78760	29	10.21240	9.93069	8	29
32	9.71850	20	9.78789	28	10.21211	9.93061	8	28
33	9.71870	21	9.78817	28	10.21183	9.93053	7	27
34	9.71891	20	9.78845	29	10.21155	9.93046	8	26
35	9.71911	21	9.78874	28	10.21126	9.93038	8	25
36	9.71932	20	9.78902	28	10.21098	9.93030	8	24
37	9.71952	21	9.78930	29	10.21070	9.93022	8	23
38	9.71973	21	9.78959	28	10.21041	9.93014	7	22
39	9.71994	20	9.78987	28	10.21013	9.93007	8	21
40	9.72014	20	9.79015	28	10.20985	9.92999	8	20
41	9.72034	21	9.79043	29	10.20957	9.92991	8	19
42	9.72055	20	9.79072	28	10.20928	9.92983	7	18
43	9.72075	21	9.79100	28	10.20900	9.92976	8	17
44	9.72096	20	9.79128	28	10.20872	9.92968	8	16
45	9.72116	21	9.79156	29	10.20844	9.92960	8	15
46	9.72137	20	9.79185	28	10.20815	9.92952	8	14
47	9.72157	20	9.79213	28	10.20787	9.92944	8	13
48	9.72177	21	9.79241	28	10.20759	9.92936	7	12
49	9.72198	20	9.79269	28	10.20731	9.92929	8	11
50	9.72218	20	9.79297	29	10.20703	9.92921	8	10
51	9.72238	21	9.79326	28	10.20674	9.92913	8	9
52	9.72259	20	9.79354	28	10.20646	9.92905	8	8
53	9.72279	20	9.79382	28	10.20618	9.92897	8	7
54	9.72299	21	9.79410	28	10.20590	9.92889	8	6
55	9.72320	20	9.79438	28	10.20562	9.92881	7	5
56	9.72340	20	9.79466	29	10.20534	9.92874	8	4
57	9.72360	21	9.79495	28	10.20505	9.92866	8	3
58	9.72381	20	9.79523	28	10.20477	9.92858	8	2
59	9.72401	20	9.79551	28	10.20449	9.92850	8	1
60	9.72421		9.79579		10.20421	9.92842		0
	Coſ.		Cot.		Tang.	Sin.		

58 Degrees.

32 Degrees.

'	Sin.	D.	Tang.	D.	Cot.	Cos.	D.	'
0	9.72421	20	9.79579	28	10.20421	9.92842	8	60
1	9.72441	20	9.79607	28	10.20393	9.92834	8	59
2	9.72461	21	9.79635	28	10.20365	9.92826	8	58
3	9.72482	20	9.79663	28	10.20337	9.92818	8	57
4	9.72502	20	9.79691	28	10.20309	9.92810	7	56
5	9.72522	20	9.79719	28	10.20281	9.92803	8	55
6	9.72542	20	9.79747	28	10.20253	9.92795	8	54
7	9.72562	20	9.79775	29	10.20225	9.92787	8	53
8	9.72582	20	9.79804	28	10.20196	9.92779	8	52
9	9.72602	20	9.79832	28	10.20168	9.92771	8	51
10	9.72622	21	9.79860	28	10.20140	9.92763	8	50
11	9.72643	20	9.79888	28	10.20112	9.92755	8	49
12	9.72663	20	9.79916	28	10.20084	9.92747	8	48
13	9.72683	20	9.79944	28	10.20056	9.92739	8	47
14	9.72703	20	9.79972	28	10.20028	9.92731	8	46
15	9.72723	20	9.80000	28	10.20000	9.92723	8	45
16	9.72743	20	9.8002	28	10.19972	9.92715	8	44
17	9.72763	20	9.80056	28	10.19944	9.92707	8	43
18	9.72783	20	9.80084	28	10.19916	9.92699	8	42
19	9.72803	20	9.80112	28	10.19888	9.92691	8	41
20	9.72823	20	9.80140	28	10.19860	9.92683	8	40
21	9.72843	20	9.80168	27	10.19832	9.92675	8	39
22	9.72863	20	9.80195	28	10.19805	9.92667	8	38
23	9.72883	19	9.80223	28	10.19777	9.92659	8	37
24	9.72902	20	9.80251	28	10.19749	9.92651	8	36
25	9.72922	20	9.80279	28	10.19721	9.92643	8	35
26	9.72942	20	9.80307	28	10.19693	9.92635	8	34
27	9.72962	20	9.80335	28	10.1966	9.92627	8	33
28	9.72982	20	9.80363	28	10.19637	9.92619	8	32
29	9.73002	20	9.80391	28	10.19609	9.92611	8	31
30	9.73022	19	9.80419	28	10.19581	9.92603	8	30
31	9.73041	20	9.80447	27	10.19553	9.92595	8	29
32	9.73061	20	9.80474	28	10.19526	9.92587	8	28
33	9.73081	20	9.80502	28	10.19498	9.92579	8	27
34	9.73101	20	9.8053	28	10.19470	9.92571	8	26
35	9.73121	19	9.80558	28	10.19442	9.92563	8	25
36	9.73140	20	9.80586	28	10.19414	9.92555	9	24
37	9.73160	20	9.80614	28	10.19386	9.92546	8	23
38	9.73180	20	9.80642	27	10.19358	9.92538	8	22
39	9.73200	19	9.80669	28	10.19331	9.92530	8	21
40	9.73219	20	9.80697	28	10.19303	9.92522	8	20
41	9.73239	20	9.80725	28	10.19275	9.92514	8	19
42	9.73259	19	9.80753	28	10.19247	9.92506	8	18
43	9.73278	20	9.80781	27	10.19219	9.92498	8	17
44	9.73298	20	9.80808	28	10.19192	9.92490	8	16
45	9.73318	19	9.80836	28	10.19164	9.92482	8	15
46	9.73337	20	9.80864	28	10.19136	9.92474	9	14
47	9.73357	20	9.80892	27	10.19108	9.92465	8	13
48	9.73377	19	9.80919	28	10.19081	9.92457	8	12
49	9.73396	20	9.80947	28	10.19053	9.92449	8	11
50	9.73416	19	9.80975	28	10.19025	9.92441	8	10
51	9.73435	20	9.81003	27	10.18997	9.92433	8	9
52	9.73455	19	9.81030	28	10.18970	9.92425	9	8
53	9.73474	20	9.81058	28	10.18942	9.92416	8	7
54	9.73494	19	9.81086	27	10.18914	9.92408	8	6
55	9.73513	20	9.81113	28	10.18887	9.92400	8	5
56	9.73533	19	9.81141	28	10.18859	9.92392	8	4
57	9.73552	20	9.81169	27	10.18831	9.92384	8	3
58	9.73572	19	9.81196	28	10.18804	9.92376	9	2
59	9.73591	20	9.81224	28	10.18776	9.92367	8	1
60	9.73611		9.81252		10.18748	9.92359		0
	Cos.		Cot.		Tang.	Sin.		'

57 Degrees.

33 Degrees.

'	Sin.	D.	Tang.	D.	Cot.	Cos.	D.	'
0	9.73611	19	9.81252	27	10.18748	9.92359	8	60
1	9.73630	20	9.81279	28	10.18721	9.92351	8	59
2	9.73650	19	9.81307	28	10.18693	9.92343	8	58
3	9.73669	20	9.81335	27	10.18665	9.92335	9	57
4	9.73689	19	9.81362	28	10.18638	9.92326	8	56
5	9.73708	19	9.81390	28	10.18610	9.92318	8	55
6	9.73727	20	9.81418	27	10.18582	9.92310	8	54
7	9.73747	19	9.81445	28	10.18555	9.92302	9	53
8	9.73766	19	9.81473	27	10.18527	9.92293	8	52
9	9.73785	20	9.81500	28	10.18500	9.92285	8	51
10	9.73805	19	9.81528	28	10.18472	9.92277	8	50
11	9.73824	19	9.81556	27	10.18444	9.92269	9	49
12	9.73843	20	9.81583	28	10.18417	9.92260	8	48
13	9.73863	19	9.81611	27	10.18389	9.92252	8	47
14	9.73882	19	9.81638	28	10.18362	9.92244	9	46
15	9.73901	20	9.81666	27	10.18334	9.92235	8	45
16	9.73921	19	9.81693	28	10.18307	9.92227	8	44
17	9.73940	19	9.81721	27	10.18279	9.92219	8	43
18	9.73959	19	9.81748	28	10.18252	9.92211	9	42
19	9.73978	19	9.81776	27	10.18224	9.92202	8	41
20	9.73997	20	9.81803	28	10.18197	9.92194	8	40
21	9.74017	19	9.81831	27	10.18169	9.92186	9	39
22	9.74036	19	9.81858	28	10.18142	9.92177	8	38
23	9.74055	19	9.81886	27	10.18114	9.92169	8	37
24	9.74074	19	9.81913	28	10.18087	9.92161	9	36
25	9.74093	20	9.81941	27	10.18059	9.92152	8	35
26	9.74113	19	9.81968	28	10.18032	9.92144	8	34
27	9.74132	19	9.81996	27	10.18004	9.92136	9	33
28	9.74151	19	9.82023	28	10.17977	9.92127	8	32
29	9.74170	19	9.82051	27	10.17949	9.92119	8	31
30	9.74189	19	9.82078	28	10.17922	9.92111	9	30
31	9.74208	19	9.82106	27	10.17894	9.92102	8	29
32	9.74227	19	9.82133	28	10.17867	9.92094	8	28
33	9.74246	19	9.82161	27	10.17839	9.92086	9	27
34	9.74265	19	9.82188	27	10.17812	9.92077	8	26
35	9.74284	19	9.82215	28	10.17785	9.92069	9	25
36	9.74303	19	9.82243	27	10.17757	9.92060	8	24
37	9.74322	19	9.82270	28	10.17730	9.92052	8	23
38	9.74341	19	9.82298	27	10.17702	9.92044	9	22
39	9.74360	19	9.82325	27	10.17675	9.92035	8	21
40	9.74379	19	9.82352	28	10.17648	9.92027	9	20
41	9.74398	19	9.82380	27	10.17620	9.92018	8	19
42	9.74417	19	9.82407	28	10.17593	9.92010	8	18
43	9.74436	19	9.82435	27	10.17565	9.92002	9	17
44	9.74455	19	9.82462	27	10.17538	9.91993	8	16
45	9.74474	19	9.82489	28	10.17511	9.91985	9	15
46	9.74493	19	9.82517	27	10.17483	9.91976	8	14
47	9.74512	19	9.82544	27	10.17456	9.91968	9	13
48	9.74531	18	9.82571	28	10.17429	9.91959	8	12
49	9.74549	19	9.82599	27	10.17401	9.91951	9	11
50	9.74568	19	9.82626	27	10.17374	9.91942	8	10
51	9.74587	19	9.82653	28	10.17347	9.91934	9	9
52	9.74606	19	9.82681	27	10.17319	9.91925	8	8
53	9.74625	19	9.82708	27	10.17292	9.91917	9	7
54	9.74644	18	9.82735	27	10.17265	9.91908	8	6
55	9.74662	19	9.82762	28	10.17238	9.91900	9	5
56	9.74681	19	9.82790	27	10.17210	9.91891	8	4
57	9.74700	19	9.82817	27	10.17183	9.91883	9	3
58	9.74719	18	9.82844	27	10.17156	9.91874	8	2
59	9.74737	19	9.82871	28	10.17129	9.91866	9	1
60	9.74756		9.82899		10.17101	9.91857		0
	Cos.		Cot.		Tang.	Sin.		'

56 Degrees.

34 Degrees.

′	Sine.	D.	Tang.	D.	Cot.	Coſ.	D.	′
0	9.74756	19	9.82899	27	10.17101	9.91857	8	60
1	9.74775	19	9.82926	27	10.17074	9.91849	9	59
2	9.74794	18	9.82953	27	10.17047	9.91840	8	58
3	9.74812	19	9.82980	28	10.17020	9.91832	9	57
4	9.74831	19	9.83008	27	10.16992	9.91823	8	56
5	9.74850	18	9.83035	27	10.16965	9.91815	9	55
6	9.74868	19	9.83062	27	10.16938	9.91806	8	54
7	9.74887	19	9.83089	28	10.16911	9.91798	9	53
8	9.74906	18	9.83117	27	10.16883	9.91789	8	52
9	9.74924	19	9.83144	27	10.16856	9.91781	9	51
10	9.74943	18	9.83171	27	10.16829	9.91772	9	50
11	9.74961	19	9.83198	27	10.16802	9.91763	8	49
12	9.74980	19	9.83225	27	10.16775	9.91755	9	48
13	9.74999	18	9.83252	28	10.16748	9.91746	8	47
14	9.75017	19	9.83280	27	10.16720	9.91738	9	46
15	9.75036	18	9.83307	27	10.16693	9.91729	9	45
16	9.75054	19	9.83334	27	10.16666	9.91720	8	44
17	9.75073	18	9.83361	27	10.16639	9.91712	9	43
18	9.75091	19	9.83388	27	10.16612	9.91703	8	42
19	9.75110	18	9.83415	27	10.16585	9.91695	9	41
20	9.75128	19	9.83442	28	10.16558	9.91686	9	40
21	9.75147	18	9.83470	27	10.16530	9.91677	8	39
22	9.75165	19	9.83497	27	10.16503	9.91669	9	38
23	9.75184	18	9.83524	27	10.16476	9.91660	9	37
24	9.75202	19	9.83551	27	10.16449	9.91651	8	36
25	9.75221	18	9.83578	27	10.16422	9.91643	9	35
26	9.75239	19	9.83605	27	10.16395	9.91634	9	34
27	9.75258	18	9.83632	27	10.16368	9.91625	8	33
28	9.75276	18	9.83659	27	10.16341	9.91617	9	32
29	9.75294	19	9.83686	27	10.16314	9.91608	9	31
30	9.75313	18	9.83713	27	10.16287	9.91599	8	30
31	9.75331	19	9.83740	28	10.16260	9.91591	9	29
32	9.75350	18	9.83768	27	10.16232	9.91582	9	28
33	9.75368	18	9.83795	27	10.16205	9.91573	8	27
34	9.75386	19	9.83822	27	10.16178	9.91565	9	26
35	9.75405	18	9.83849	27	10.16151	9.91556	9	25
36	9.75423	18	9.83876	27	10.16124	9.91547	9	24
37	9.75441	18	9.83903	27	10.16097	9.91538	8	23
38	9.75459	19	9.83930	27	10.16070	9.91530	9	22
39	9.75478	18	9.83957	27	10.16043	9.91521	9	21
40	9.75496	18	9.83984	27	10.16016	9.91512	8	20
41	9.75514	19	9.84011	27	10.15989	9.91504	9	19
42	9.75533	18	9.84038	27	10.15962	9.91495	9	18
43	9.75551	18	9.84065	27	10.15935	9.91486	9	17
44	9.75569	18	9.84092	27	10.15908	9.91477	8	16
45	9.75587	18	9.84119	27	10.15881	9.91469	9	15
46	9.75605	19	9.84146	27	10.15854	9.91460	9	14
47	9.75624	18	9.84173	27	10.15827	9.91451	9	13
48	9.75642	18	9.84200	27	10.15800	9.91442	9	12
49	9.75660	18	9.84227	27	10.15773	9.91433	8	11
50	9.75678	18	9.84254	26	10.15746	9.91425	9	10
51	9.75696	18	9.84280	27	10.15720	9.91416	9	9
52	9.75714	19	9.84307	27	10.15693	9.91407	9	8
53	9.75733	18	9.84334	27	10.15666	9.91398	9	7
54	9.75751	18	9.84361	27	10.15639	9.91389	8	6
55	9.75769	18	9.84388	27	10.15612	9.91381	9	5
56	9.75787	18	9.84415	27	10.15585	9.91372	9	4
57	9.75805	18	9.84442	27	10.15558	9.91363	9	3
58	9.75823	18	9.84469	27	10.15531	9.91354	9	2
59	9.75841	18	9.84496	27	10.15504	9.91345	9	1
60	9.75859		9.84523		10.15477	9.91336		0
	Coſ.		Cot.		Tang.	Sine.		

55 Degrees.

35 Degrees.

′	Sine.	D.	Tang.	D.	Cot.	Coſ.	D.	′
0	9.75859	18	9.84523	27	10.15477	9.91336	8	60
1	9.75877	18	9.84550	26	10.15450	9.91328	9	59
2	9.75895	18	9.84576	27	10.15424	9.91319	9	58
3	9.75913	18	9.84603	27	10.15397	9.91310	9	57
4	9.75931	18	9.84630	27	10.15370	9.91301	9	56
5	9.75949	18	9.84657	27	10.15343	9.91292	9	55
6	9.75967	18	9.84684	27	10.15316	9.91283	9	54
7	9.75985	18	9.84711	27	10.15289	9.91274	8	53
8	9.76003	18	9.84738	26	10.15262	9.91266	9	52
9	9.76021	18	9.84764	27	10.15236	9.91257	9	51
10	9.76039	18	9.84791	27	10.15209	9.91248	9	50
11	9.76057	18	9.84818	27	10.15182	9.91239	9	49
12	9.76075	18	9.84845	27	10.15155	9.91230	9	48
13	9.76093	18	9.84872	27	10.15128	9.91221	9	47
14	9.76111	18	9.84899	26	10.15101	9.91212	9	46
15	9.76129	17	9.84925	27	10.15075	9.91203	9	45
16	9.76146	18	9.84952	27	10.15048	9.91194	9	44
17	9.76164	18	9.84979	27	10.15021	9.91185	9	43
18	9.76182	18	9.85006	27	10.14994	9.91176	9	42
19	9.76200	18	9.85033	26	10.14967	9.91167	9	41
20	9.76218	18	9.85059	27	10.14941	9.91158	9	40
21	9.76236	17	9.85086	27	10.14914	9.91149	8	39
22	9.76253	18	9.85113	27	10.14887	9.91141	9	38
23	9.76271	18	9.85140	26	10.14860	9.91132	9	37
24	9.76289	18	9.85166	27	10.14834	9.91123	9	36
25	9.76307	17	9.85193	27	10.14807	9.91114	9	35
26	9.76324	18	9.85220	27	10.14780	9.91105	9	34
27	9.76342	18	9.85247	26	10.14753	9.91096	9	33
28	9.76360	18	9.85273	27	10.14727	9.91087	9	32
29	9.76378	17	9.85300	27	10.14700	9.91078	9	31
30	9.76395	18	9.85327	27	10.14673	9.91069	9	30
31	9.76413	18	9.85354	26	10.14646	9.91060	9	29
32	9.76431	17	9.85380	27	10.14620	9.91051	9	28
33	9.76448	18	9.85407	27	10.14593	9.91042	9	27
34	9.76466	18	9.85434	26	10.14566	9.91033	10	26
35	9.76484	17	9.85460	27	10.14540	9.91023	9	25
36	9.76501	18	9.85487	27	10.14513	9.91014	9	24
37	9.76519	18	9.85514	26	10.14486	9.91005	9	23
38	9.76537	17	9.85540	27	10.14460	9.90996	9	22
39	9.76554	18	9.85567	27	10.14433	9.90987	9	21
40	9.76572	18	9.85594	26	10.14406	9.90978	9	20
41	9.76590	17	9.85620	27	10.14380	9.90969	9	19
42	9.76607	18	9.85647	27	10.14353	9.90960	9	18
43	9.76625	17	9.85674	26	10.14326	9.90951	9	17
44	9.76642	18	9.85700	27	10.14300	9.90942	9	16
45	9.76660	17	9.85727	27	10.14273	9.90933	9	15
46	9.76677	18	9.85754	27	10.14246	9.90924	9	14
47	9.76695	17	9.85781	26	10.14219	9.90915	9	13
48	9.76712	18	9.85807	27	10.14193	9.90906	10	12
49	9.76730	17	9.85834	27	10.14166	9.90896	9	11
50	9.76747	18	9.85861	26	10.14139	9.90887	9	10
51	9.76765	17	9.85887	27	10.14113	9.90878	9	9
52	9.76782	18	9.85914	26	10.14086	9.90869	9	8
53	9.76800	17	9.85940	27	10.14060	9.90860	9	7
54	9.76817	18	9.85967	27	10.14033	9.90851	9	6
55	9.76835	17	9.85994	26	10.14006	9.90842	10	5
56	9.76852	18	9.86020	27	10.13980	9.90832	9	4
57	9.76870	17	9.86047	26	10.13953	9.90823	9	3
58	9.76887	17	9.86073	27	10.13927	9.90814	9	2
59	9.76904	18	9.86100	26	10.13900	9.90805	9	1
60	9.76922		9.86126		10.13874	9.90796		0
	Coſ.		Cot.		Tang.	Sine.		

54 Degrees.

36 Degrees.

'	Sin.	D.	Tang.	D.	Cot.	Coſ.	D.	'
0	9.76922	17	9.86126	27	10.13874	9.90796	9	60
1	9.76939	18	9.86153	26	10.13847	9.90787	10	59
2	9.76957	17	9.86179	27	10.13821	9.90777	9	58
3	9.76974	17	9.86206	26	10.13794	9.90768	9	57
4	9.76991	18	9.86232	27	10.13768	9.90759	9	56
5	9.77009	17	9.86259	26	10.13741	9.90750	9	55
6	9.77026	17	9.86285	27	10.13715	9.90741	10	54
7	9.77043	18	9.86312	26	10.13688	9.90731	9	53
8	9.77061	17	9.86338	27	10.13662	9.90722	9	52
9	9.77078	17	9.86365	27	10.13635	9.90713	9	51
10	9.77095	17	9.86392	26	10.13608	9.90704	10	50
11	9.77112	18	9.86418	27	10.13582	9.90694	9	49
12	9.77130	17	9.86445	26	10.13555	9.90685	9	48
13	9.77147	17	9.86471	27	10.13529	9.90676	9	47
14	9.77164	17	9.86498	26	10.13502	9.90667	10	46
15	9.77181	18	9.86524	27	10.13476	9.90657	9	45
16	9.77199	17	9.86551	26	10.13449	9.90648	9	44
17	9.77216	17	9.86577	26	10.13423	9.90639	9	43
18	9.77233	17	9.86603	27	10.13397	9.90630	10	42
19	9.77250	18	9.86630	26	10.13370	9.90620	9	41
20	9.77268	17	9.86656	27	10.13344	9.90611	9	40
21	9.77285	17	9.86683	26	10.13317	9.90602	10	39
22	9.77302	17	9.86709	27	10.13291	9.90592	9	38
23	9.77319	17	9.86736	26	10.13264	9.90583	9	37
24	9.77336	17	9.86762	27	10.13238	9.90574	9	36
25	9.77353	17	9.86789	26	10.13211	9.90565	10	35
26	9.77370	17	9.86815	27	10.13185	9.90555	9	34
27	9.77387	18	9.86842	26	10.13158	9.90546	9	33
28	9.77405	17	9.86868	26	10.13132	9.90537	10	32
29	9.77422	17	9.86894	27	10.13106	9.90527	9	31
30	9.77439	17	9.86921	26	10.13079	9.90518	9	30
31	9.77456	17	9.86947	27	10.13053	9.90509	10	29
32	9.77473	17	9.86974	26	10.13026	9.90499	9	28
33	9.77490	17	9.87000	27	10.13000	9.90490	10	27
34	9.77507	17	9.87027	26	10.12973	9.90480	9	26
35	9.77524	17	9.87053	26	10.12947	9.90471	9	25
36	9.77541	17	9.87079	27	10.12921	9.90462	10	24
37	9.77558	17	9.87106	26	10.12894	9.90452	9	23
38	9.77575	17	9.87132	26	10.12868	9.90443	9	22
39	9.77592	17	9.87158	27	10.12842	9.90434	10	21
40	9.77609	17	9.87185	26	10.12815	9.90424	9	20
41	9.77626	17	9.87211	27	10.12789	9.90415	10	19
42	9.77643	17	9.87238	26	10.12762	9.90405	9	18
43	9.77660	17	9.87264	26	10.12736	9.90396	10	17
44	9.77677	17	9.87290	27	10.12710	9.90386	9	16
45	9.77694	17	9.87317	26	10.12683	9.90377	9	15
46	9.77711	17	9.87343	26	10.12657	9.90368	10	14
47	9.77728	16	9.87369	27	10.12631	9.90358	9	13
48	9.77744	17	9.87396	26	10.12604	9.90349	10	12
49	9.77761	17	9.87422	26	10.12578	9.90339	9	11
50	9.77778	17	9.87448	27	10.12552	9.90330	10	10
51	9.77795	17	9.87475	26	10.12525	9.90320	9	9
52	9.77812	17	9.87501	26	10.12499	9.90311	10	8
53	9.77829	16	9.87527	27	10.12473	9.90301	9	7
54	9.77845	17	9.87554	26	10.12446	9.90292	10	6
55	9.77862	17	9.87580	26	10.12420	9.90282	9	5
56	9.77879	17	9.87606	27	10.12394	9.90273	10	4
57	9.77896	17	9.87633	26	10.12367	9.90263	9	3
58	9.77913	17	9.87659	26	10.12341	9.90254	10	2
59	9.77930	16	9.87685	26	10.12315	9.90244	9	1
60	9.77946		9.87711		10.12289	9.90235		0
	Coſ.		Cot.		Tang.	Sin.		

53 Degrees.

37 Degrees.

'	Sin.	D.	Tang.	D.	Cot.	Coſ.	D.	'
0	9.77946	17	9.87711	27	10.12289	9.90235	10	60
1	9.77963	17	9.87738	26	10.12262	9.90225	9	59
2	9.77980	17	9.87764	26	10.12236	9.90216	10	58
3	9.77997	16	9.87790	27	10.12210	9.90206	9	57
4	9.78013	17	9.87817	26	10.12183	9.90197	10	56
5	9.78030	17	9.87843	26	10.12157	9.90187	9	55
6	9.78047	16	9.87869	26	10.12131	9.90178	10	54
7	9.78063	17	9.87895	27	10.12105	9.90168	9	53
8	9.78080	17	9.87922	26	10.12078	9.90159	10	52
9	9.78097	16	9.87948	26	10.12052	9.90149	10	51
10	9.78113	17	9.87974	26	10.12026	9.90139	9	50
11	9.78130	17	9.88000	27	10.12000	9.90130	10	49
12	9.78147	16	9.88027	26	10.11973	9.90120	9	48
13	9.78163	17	9.88053	26	10.11947	9.90111	10	47
14	9.78180	17	9.88079	26	10.11921	9.90101	10	46
15	9.78197	16	9.88105	26	10.11895	9.90091	9	45
16	9.78213	17	9.88131	27	10.11869	9.90082	10	44
17	9.78230	16	9.88158	26	10.11842	9.90072	9	43
18	9.78246	17	9.88184	26	10.11816	9.90063	10	42
19	9.78263	17	9.88210	26	10.11790	9.90053	10	41
20	9.78280	16	9.88236	26	10.11764	9.90043	9	40
21	9.78296	17	9.88262	27	10.11738	9.90034	10	39
22	9.78313	16	9.88289	26	10.11711	9.90024	10	38
23	9.78329	17	9.88315	26	10.11685	9.90014	9	37
24	9.78346	16	9.88341	26	10.11659	9.90005	10	36
25	9.78362	17	9.88367	26	10.11633	9.89995	10	35
26	9.78379	16	9.88393	27	10.11607	9.89985	9	34
27	9.78395	17	9.88420	26	10.11580	9.89976	10	33
28	9.78412	16	9.88446	26	10.11554	9.89966	10	32
29	9.78428	17	9.88472	26	10.11528	9.89956	9	31
30	9.78445	16	9.88498	26	10.11502	9.89947	10	30
31	9.78461	17	9.88524	26	10.11476	9.89937	10	29
32	9.78478	16	9.88550	27	10.11450	9.89927	9	28
33	9.78494	16	9.88577	26	10.11423	9.89918	10	27
34	9.78510	17	9.88603	26	10.11397	9.89908	10	26
35	9.78527	16	9.88629	26	10.11371	9.89898	10	25
36	9.78543	17	9.88655	26	10.11345	9.89888	9	24
37	9.78560	16	9.88681	26	10.11319	9.89879	10	23
38	9.78576	16	9.88707	26	10.11293	9.89869	10	22
39	9.78592	17	9.88733	26	10.11267	9.89859	10	21
40	9.78609	16	9.88759	27	10.11241	9.89849	9	20
41	9.78625	17	9.88786	26	10.11214	9.89840	10	19
42	9.78642	16	9.88812	26	10.11188	9.89830	10	18
43	9.78658	16	9.88838	26	10.11162	9.89820	10	17
44	9.78674	17	9.88864	26	10.11136	9.89810	9	16
45	9.78691	16	9.88890	26	10.11110	9.89801	10	15
46	9.78707	16	9.88916	26	10.11084	9.89791	10	14
47	9.78723	16	9.88942	26	10.11058	9.89781	10	13
48	9.78739	17	9.88968	26	10.11032	9.89771	10	12
49	9.78756	16	9.88994	26	10.11006	9.89761	9	11
50	9.78772	16	9.89020	26	10.10980	9.89752	10	10
51	9.78788	17	9.89046	27	10.10954	9.89742	10	9
52	9.78805	16	9.89073	26	10.10927	9.89732	10	8
53	9.78821	16	9.89099	26	10.10901	9.89722	10	7
54	9.78837	16	9.89125	26	10.10875	9.89712	10	6
55	9.78853	16	9.89151	26	10.10849	9.89702	9	5
56	9.78869	17	9.89177	26	10.10823	9.89693	10	4
57	9.78886	16	9.89203	26	10.10797	9.89683	10	3
58	9.78902	16	9.89229	26	10.10771	9.89673	10	2
59	9.78918	16	9.89255	26	10.10745	9.89663	10	1
60	9.78934		9.89281		10.10719	9.89653		0
	Coſ.		Cot.		Tang.	Sin.		

52 Degrees.

38 Degrees.

′	Sin.	D	Tang.	D.	Cot.	Coſ.	D.	′
0	9.78934	16	9.89281	26	10.10719	9.89653	10	60
1	9.78950	17	9.89307	26	10.10693	9.89643	10	59
2	9.78967	16	9.89333	26	10.10667	9.89633	9	58
3	9.78983	16	9.89359	26	10.10641	9.89624	10	57
4	9.78999	16	9.89385	26	10.10615	9.89614	10	56
5	9.79015	16	9.89411	26	10.10589	9.89604	10	55
6	9.79031	16	9.89437	26	10.10563	9.89594	10	54
7	9.79047	16	9.89463	26	10.10537	9.89584	10	53
8	9.79063	16	9.89489	26	10.10511	9.89574	10	52
9	9.79079	16	9.89515	26	10.10485	9.89564	10	51
10	9.79095	16	9.89541	26	10.10459	9.89554	10	50
11	9.79111	17	9.89567	26	10.10433	9.89544	10	49
12	9.79128	16	9.89593	26	10.10407	9.89534	10	48
13	9.79144	16	9.89619	26	10.10381	9.89524	10	47
14	9.79160	16	9.89645	26	10.10855	9.89514	10	46
15	9.79176	16	9.89671	26	10.10329	9.89504	9	45
16	9.79192	16	9.89697	26	10.10303	9.89495	10	44
17	9.79208	16	9.89723	26	10.10277	9.89485	10	43
18	9.79224	16	9.89749	26	10.10251	9.89475	10	42
19	9.79240	16	9.89775	26	10.10225	9.89465	10	41
20	9.79256	16	9.89801	26	10.10199	9.89455	10	40
21	9.79272	16	9.89827	26	10.10173	9.89445	10	39
22	9.79288	16	9.89853	26	10.10147	9.89435	10	38
23	9.79304	15	9.89879	26	10.10121	9.89425	10	37
24	9.79319	16	9.89905	26	10.10095	9.89415	10	36
25	9.79335	16	9.89931	26	10.10069	9.89405	10	35
26	9.79351	16	9.89957	26	10.10043	9.89395	10	34
27	9.79367	16	9.89983	26	10.10017	9.89385	10	33
28	9.79383	16	9.90009	26	10.09991	9.89375	11	32
29	9.79399	16	9.90035	26	10.09965	9.89364	10	31
30	9.79415	16	9.90061	25	10.09939	9.89354	10	30
31	9.79431	16	9.90086	26	10.09914	9.89344	10	29
32	9.79447	16	9.90112	26	10.09888	9.89334	10	28
33	9.79463	15	9.90138	26	10.09862	9.89324	10	27
34	9.79478	16	9.90164	26	10.09836	9.89314	10	26
35	9.79494	16	9.90190	26	10.09810	9.89304	10	25
36	9.79510	16	9.90216	26	10.09784	9.89294	10	24
37	9.79526	16	9.90242	26	10.09758	9.89284	10	23
38	9.79542	16	9.90268	26	10.09732	9.89274	10	22
39	9.79558	15	9.90294	26	10.09706	9.89264	10	21
40	9.79573	16	9.90320	26	10.09680	9.89254	10	20
41	9.79589	16	9.90346	25	10.09654	9.89244	11	19
42	9.79605	16	9.90371	26	10.09629	9.89233	10	18
43	9.79621	15	9.90397	26	10.09603	9.89223	10	17
44	9.79636	16	9.90423	26	10.09577	9.89213	10	16
45	9.79652	16	9.90449	26	10.09551	9.89203	10	15
46	9.79668	16	9.90475	26	10.09525	9.89193	10	14
47	9.79684	15	9.90501	26	10.09499	9.89183	10	13
48	9.79699	16	9.90527	26	10.09473	9.89173	11	12
49	9.79715	16	9.90553	25	10.09447	9.89162	10	11
50	9.79731	15	9.90578	26	10.09422	9.89152	10	10
51	9.79746	16	9.90604	26	10.09396	9.89142	10	9
52	9.79762	15	9.90630	26	10.09370	9.89132	10	8
53	9.79777	16	9.90656	26	10.09344	9.89122	10	7
54	9.79793	16	9.90682	26	10.09318	9.89112	11	6
55	9.79809	16	9.90708	26	10.09292	9.89101	10	5
56	9.79825	15	9.90734	25	10.09266	9.89091	10	4
57	9.79840	16	9.90759	26	10.09241	9.89081	10	3
58	9.79856	16	9.90785	26	10.09215	9.89071	11	2
59	9.79872	15	9.90811	26	10.09189	9.89060	10	1
60	9.79887		9.90837		10.09163	9.89050		0
	Coſ.		Cot.		Tang.	Sin.		′

51 Degrees.

39 Degrees.

′	Sin.	D	Tang.	D.	Cot.	Coſ.	D.	′
0	9.79887	16	9.90837	26	10.09163	9.89050	10	60
1	9.79903	15	9.90863	26	10.09137	9.89040	10	59
2	9.79918	16	9.90889	25	10.09111	9.89030	10	58
3	9.79934	16	9.90914	26	10.09086	9.89020	11	57
4	9.79950	15	9.90940	26	10.09060	9.89009	10	56
5	9.79965	16	9.90966	26	10.09034	9.88999	10	55
6	9.79981	15	9.90992	26	10.09008	9.88989	11	54
7	9.79996	16	9.91018	25	10.08982	9.88978	10	53
8	9.80012	15	9.91043	26	10.08957	9.88968	10	52
9	9.80027	16	9.91069	26	10.08931	9.88958	10	51
10	9.80043	15	9.91095	26	10.08905	9.88948	11	50
11	9.80058	16	9.91121	26	10.08879	9.88937	10	49
12	9.80074	15	9.91147	25	10.08853	9.88927	10	48
13	9.80089	16	9.91172	26	10.08828	9.88917	11	47
14	9.80105	15	9.91198	26	10.08802	9.88906	10	46
15	9.80120	16	9.91224	26	10.08776	9.88896	10	45
16	9.80136	15	9.91250	26	10.08750	9.88886	11	44
17	9.80151	15	9.91276	25	10.08724	9.88875	10	43
18	9.80166	16	9.91301	26	10.08699	9.88865	10	42
19	9.80182	15	9.91327	26	10.08673	9.88855	11	41
20	9.80197	16	9.91353	26	10.08647	9.88844	10	40
21	9.80213	15	9.91379	25	10.08621	9.88834	10	39
22	9.80228	16	9.91404	26	10.08596	9.88824	11	38
23	9.80244	15	9.91430	26	10.08570	9.88813	10	37
24	9.80259	15	9.91456	26	10.08544	9.88803	10	36
25	9.80274	16	9.91482	25	10.08518	9.88793	11	35
26	9.80290	15	9.91507	26	10.08493	9.88782	10	34
27	9.80305	15	9.91533	26	10.08467	9.88772	11	33
28	9.80320	16	9.91559	26	10.08441	9.88761	10	32
29	9.80336	15	9.91585	25	10.08415	9.88751	10	31
30	9.80351	15	9.91610	26	10.08390	9.88741	11	30
31	9.80366	16	9.91636	26	10.08364	9.88730	10	29
32	9.80382	15	9.91662	26	10.08338	9.88720	11	28
33	9.80397	15	9.91688	25	10.08312	9.88709	10	27
34	9.80412	16	9.91713	26	10.08287	9.88699	11	26
35	9.80428	15	9.91739	26	10.08261	9.88688	10	25
36	9.80443	15	9.91765	26	10.08235	9.88678	11	24
37	9.80458	15	9.91791	25	10.08209	9.88667	10	23
38	9.80473	16	9.91816	26	10.08184	9.88657	10	22
39	9.80489	15	9.91842	26	10.08158	9.88647	11	21
40	9.80504	15	9.91868	25	10.08132	9.88636	10	20
41	9.80519	15	9.91893	26	10.08107	9.88626	11	19
42	9.80534	16	9.91919	26	10.08081	9.88615	10	18
43	9.80550	15	9.91945	26	10.08055	9.88605	11	17
44	9.80565	15	9.91971	25	10.08029	9.88594	10	16
45	9.80580	15	9.91996	26	10.08004	9.88584	11	15
46	9.80595	15	9.92022	26	10.07978	9.88573	10	14
47	9.80610	15	9.92048	26	10.07952	9.88563	11	13
48	9.80625	16	9.92074	25	10.07926	9.88552	10	12
49	9.80641	15	9.92099	26	10.07901	9.88542	11	11
50	9.80656	15	9.92125	26	10.07875	9.88531	10	10
51	9.80671	15	9.92151	25	10.07849	9.88521	11	9
52	9.80686	15	9.92176	26	10.07824	9.88510	11	8
53	9.80701	15	9.92202	26	10.07798	9.88499	10	7
54	9.80716	15	9.92227	26	10.07773	9.88489	11	6
55	9.80731	15	9.92253	26	10.07747	9.88478	10	5
56	9.80746	16	9.92279	25	10.07721	9.88468	11	4
57	9.80762	15	9.92304	26	10.07696	9.88457	10	3
58	9.80777	15	9.92330	26	10.07670	9.88447	11	2
59	9.80792	15	9.92356	25	10.07644	9.88436	11	1
60	9.80807		9.92381		10.07619	9.88425		0
	Coſ.		Cot.		Tang.	Sin.		′

50 Degrees.

40 Degrees.

'	Sin.	D.	Tang.	D.	Cot.	Cos.	D.	'
0	9.80807	15	9.92381	26	10.07619	9.88425	10	60
1	9.80822	15	9.92407	26	10.07593	9.88415	11	59
2	9.80837	15	9.92433	25	10.07567	9.88404	10	58
3	9.80852	15	9.92458	26	10.07542	9.88394	11	57
4	9.80867	15	9.92484	26	10.07516	9.88383	11	56
5	9.80882	15	9.92510	25	10.07490	9.88372	10	55
6	9.80897	15	9.92535	26	10.07465	9.88362	11	54
7	9.80912	15	9.92561	26	10.07439	9.88351	11	53
8	9.80927	15	9.92587	25	10.07413	9.88340	10	52
9	9.80942	15	9.92612	26	10.07388	9.88330	11	51
10	9.80957	15	9.92638	25	10.07362	9.88319	11	50
11	9.80972	15	9.92663	26	10.07337	9.88308	10	49
12	9.80987	15	9.92689	26	10.07311	9.88298	11	48
13	9.81002	15	9.92715	25	10.07285	9.88287	11	47
14	9.81017	15	9.92740	26	10.07260	9.88276	10	46
15	9.81032	15	9.92766	26	10.07234	9.88266	11	45
16	9.81047	14	9.92792	25	10.07208	9.88255	11	44
17	9.81061	15	9.92817	26	10.07183	9.88244	10	43
18	9.81076	15	9.92843	25	10.07157	9.88234	11	42
19	9.81091	15	9.92868	26	10.07132	9.88223	11	41
20	9.81106	15	9.92894	26	10.07106	9.88212	11	40
21	9.81121	15	9.92920	25	10.07080	9.88201	10	39
22	9.81136	15	9.92945	26	10.07055	9.88191	11	38
23	9.81151	15	9.92971	25	10.07029	9.88180	11	37
24	9.81166	14	9.92996	26	10.07004	9.88169	11	36
25	9.81180	15	9.93022	26	10.06978	9.88158	10	35
26	9.81195	15	9.93048	25	10.06952	9.88148	11	34
27	9.81210	15	9.93073	26	10.06927	9.88137	11	33
28	9.81225	15	9.93099	25	10.06901	9.88126	11	32
29	9.81240	14	9.93124	26	10.06876	9.88115	11	31
30	9.81254	15	9.93150	25	10.06850	9.88104	10	30
31	9.81269	15	9.93175	26	10.06825	9.88094	11	29
32	9.81284	15	9.93201	26	10.06799	9.88083	11	28
33	9.81299	15	9.93227	25	10.06773	9.88072	11	27
34	9.81314	14	9.93252	26	10.06748	9.88061	10	26
35	9.81328	15	9.93278	25	10.06722	9.88051	11	25
36	9.81343	15	9.93303	26	10.06697	9.88040	11	24
37	9.81358	14	9.93329	25	10.06671	9.88029	11	23
38	9.81372	15	9.93354	26	10.06646	9.88018	11	22
39	9.81387	15	9.93380	26	10.06620	9.88007	11	21
40	9.81402	15	9.93406	25	10.06594	9.87996	11	20
41	9.81417	14	9.93431	26	10.06569	9.87985	10	19
42	9.81431	15	9.93457	25	10.06543	9.87975	11	18
43	9.81446	15	9.93482	26	10.06518	9.87964	11	17
44	9.81461	14	9.93508	25	10.06492	9.87953	11	16
45	9.81475	15	9.93533	26	10.06467	9.87942	11	15
46	9.81490	15	9.93559	25	10.06441	9.87931	11	14
47	9.81505	14	9.93584	26	10.06416	9.87920	11	13
48	9.81519	15	9.93610	26	10.06390	9.87909	11	12
49	9.81534	15	9.93636	25	10.06364	9.87898	11	11
50	9.81549	14	9.93661	26	10.06339	9.87887	10	10
51	9.81563	15	9.93687	25	10.06313	9.87877	11	9
52	9.81578	14	9.93712	26	10.06288	9.87866	11	8
53	9.81592	15	9.93738	25	10.06262	9.87855	11	7
54	9.81607	15	9.93763	26	10.06237	9.87844	11	6
55	9.81622	14	9.93789	25	10.06211	9.87833	11	5
56	9.81636	15	9.93814	26	10.06186	9.87822	11	4
57	9.81651	14	9.93840	25	10.06160	9.87811	11	3
58	9.81665	15	9.93865	26	10.06135	9.87800	11	2
59	9.81680	14	9.93891	25	10.06109	9.87789	11	1
60	9.81694		9.93916		10.06084	9.87778		0
	Cos.		Cot.		Tang.	Sin.		

49 Degrees.

41 Degrees.

'	Sin.	D.	Tang.	D.	Cot.	Cos.	D.	'
0	9.81694	15	9.93916	26	10.06084	9.87778	11	60
1	9.81709	14	9.93942	25	10.06058	9.87767	11	59
2	9.81723	15	9.93967	26	10.06033	9.87756	11	58
3	9.81738	14	9.93993	25	10.06007	9.87745	11	57
4	9.81752	15	9.94018	26	10.05982	9.87734	11	56
5	9.81767	14	9.94044	25	10.05956	9.87723	11	55
6	9.81781	15	9.94069	26	10.05931	9.87712	11	54
7	9.81796	14	9.94095	25	10.05905	9.87701	11	53
8	9.81810	15	9.94120	26	10.05880	9.87690	11	52
9	9.81825	14	9.94146	25	10.05854	9.87679	11	51
10	9.81839	15	9.94171	26	10.05829	9.87668	11	50
11	9.81854	14	9.94197	25	10.05803	9.87657	11	49
12	9.81868	14	9.94222	26	10.05778	9.87646	11	48
13	9.81882	15	9.94248	25	10.05752	9.87635	11	47
14	9.81897	14	9.94273	26	10.05727	9.87624	11	46
15	9.81911	15	9.94299	25	10.05701	9.87613	12	45
16	9.81926	14	9.94324	26	10.05676	9.87601	11	44
17	9.81940	14	9.94350	25	10.05650	9.87590	11	43
18	9.81954	15	9.94375	26	10.05625	9.87579	11	42
19	9.81969	14	9.94401	25	10.05599	9.87568	11	41
20	9.81983	15	9.94426	26	10.05574	9.87557	11	40
21	9.81998	14	9.94452	25	10.05548	9.87546	11	39
22	9.82012	14	9.94477	26	10.05523	9.87535	11	38
23	9.82026	15	9.94503	25	10.05497	9.87524	11	37
24	9.82041	14	9.94528	26	10.05472	9.87513	12	36
25	9.82055	14	9.94554	25	10.05446	9.87501	11	35
26	9.82069	15	9.94579	25	10.05421	9.87490	11	34
27	9.82084	14	9.94604	26	10.05396	9.87479	11	33
28	9.82098	14	9.94630	25	10.05370	9.87468	11	32
29	9.82112	14	9.94655	26	10.05345	9.87457	11	31
30	9.82126	15	9.94681	25	10.05319	9.87446	12	30
31	9.82141	14	9.94706	26	10.05294	9.87434	11	29
32	9.82155	14	9.94732	25	10.05268	9.87423	11	28
33	9.82169	15	9.94757	26	10.05243	9.87412	11	27
34	9.82184	14	9.94783	25	10.05217	9.87401	11	26
35	9.82198	14	9.94808	26	10.05192	9.87390	12	25
36	9.82212	14	9.94834	25	10.05166	9.87378	11	24
37	9.82226	14	9.94859	25	10.05141	9.87367	11	23
38	9.82240	15	9.94884	26	10.05116	9.87356	11	22
39	9.82255	14	9.94910	25	10.05090	9.87345	11	21
40	9.82269	14	9.94935	26	10.05065	9.87334	12	20
41	9.82283	14	9.94961	25	10.05039	9.87322	11	19
42	9.82297	14	9.94986	26	10.05014	9.87311	11	18
43	9.82311	15	9.95012	25	10.04988	9.87300	12	17
44	9.82326	14	9.95037	25	10.04963	9.87288	11	16
45	9.82340	14	9.95062	26	10.04938	9.87277	11	15
46	9.82354	14	9.95088	25	10.04912	9.87266	11	14
47	9.82368	14	9.95113	26	10.04887	9.87255	12	13
48	9.82382	14	9.95139	25	10.04861	9.87243	11	12
49	9.82396	14	9.95164	26	10.04836	9.87232	11	11
50	9.82410	14	9.95190	25	10.04810	9.87221	12	10
51	9.82424	15	9.95215	25	10.04785	9.87209	11	9
52	9.82439	14	9.95240	26	10.04760	9.87198	11	8
53	9.82453	14	9.95266	25	10.04734	9.87187	12	7
54	9.82467	14	9.95291	26	10.04709	9.87175	11	6
55	9.82481	14	9.95317	25	10.04683	9.87164	11	5
56	9.82495	14	9.95342	26	10.04658	9.87153	12	4
57	9.82509	14	9.95368	25	10.04632	9.87141	11	3
58	9.82523	14	9.95393	25	10.04607	9.87130	11	2
59	9.82537	14	9.95418	26	10.04582	9.87119	12	1
60	9.82551		9.95444		10.04556	9.87107		0
	Cos.		Cot.		Tang.	Sin.		

48 Degrees.

42 Degrees.

M.	Sine	D.	Tang.	D.	Cotang.	Cosine	D.	M.
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.04429	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	9.86982		49
[illegible]	[illegible]		[illegible]		10.04252	9.86970		[illegible]
[illegible]	[illegible]		[illegible]		10.04226	9.86959		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.04175	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.04099	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
20	9.82830		9.95952		[illegible]	9.8687[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.04023	9.86867		[illegible]
[illegible]	[illegible]		[illegible]		10.0399[illegible]	9.86855		38
[illegible]	[illegible]		[illegible]		[illegible]	9.86844		37
[illegible]	[illegible]		[illegible]		10.03947	9.86832		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.03896	9.86809		[illegible]
[illegible]	[illegible]		9.96129		[illegible]	9.86798		33
[illegible]	[illegible]		9.96155		10.0384[illegible]	9.86786		[illegible]
29	9.8295[illegible]		9.96180		10.03820	[illegible]		[illegible]
[illegible]	[illegible]		9.96205		10.03795	9.86763		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	9.86752		29
32	9.82996		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		9.96307		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.03668	9.86705		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	9.86694		[illegible]
37	9.83065		[illegible]		[illegible]	9.86682		[illegible]
[illegible]	[illegible]		[illegible]		10.03592	9.86670		22
[illegible]	[illegible]		[illegible]		10.03567	9.86659		21
[illegible]	[illegible]		[illegible]		[illegible]	9.86647		[illegible]
[illegible]	[illegible]		[illegible]		10.03516	9.86635		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	9.86624		18
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		17
[illegible]	[illegible]		[illegible]		10.0344[illegible]	9.86600		16
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		9.96611		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.03262	9.86518		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.03212	9.86495		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
	Cosine	D.	Cotang.	D.	Tang.	Sine	D.	M.

47 Degrees.

43 Degrees.

M.	Sine	D.	Tang.	D.	Cotang.	Cosine	D.	M.
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
6	9.83459		9.97118		10.02882	9.86342		54
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	9.86283		49
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		9.97320		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		9.97345		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.02629	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.02579	[illegible]		[illegible]
[illegible]	[illegible]		9.97447		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
21	[illegible]		9.97497		10.02503	9.86164		[illegible]
[illegible]	[illegible]		[illegible]		10.02477	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.02452	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.02427	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.02402	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.02376	[illegible]		[illegible]
[illegible]	[illegible]		9.97649		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		9.97674		[illegible]	9.86080		[illegible]
[illegible]	[illegible]		[illegible]		10.02300	9.86068		[illegible]
[illegible]	[illegible]		[illegible]		10.0227[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	9.86044		[illegible]
[illegible]	[illegible]		9.97776		10.02224	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.02199	[illegible]		[illegible]
[illegible]	[illegible]		9.97826		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		9.97877		10.02123	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		9.97927		10.02073	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.02047	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.02022	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.01946	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.01921	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		10.01794	9.85827		11
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
56	9.84125		9.98383		10.01617	9.85742		4
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
59	9.84164		9.98458		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
	Cosine	D.	Cotang.	D.	Tang.	Sine	D.	M.

46 Degrees.

44 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Coſ.	D.	′
0	9.84177	13	9.98484	25	10.01516	9.85693	12	60
1	9.84190	13	9.98509	25	10.01491	9.85681	12	59
2	9.84203	13	9.98534	26	10.01466	9.85669	12	58
3	9.84216	13	9.98560	25	10.01440	9.85657	12	57
4	9.84229	13	9.98585	25	10.01415	9.85645	13	56
5	9.84242	13	9.98610	25	10.01390	9.85632	12	55
6	9.84255	14	9.98635	26	10.01365	9.85620	12	54
7	9.84269	13	9.98661	25	10.01339	9.85608	12	53
8	9.84282	13	9.98686	25	10.01314	9.85596	13	52
9	9.84295	13	9.98711	26	10.01289	9.85583	12	51
10	9.84308	13	9.98737	25	10.01263	9.85571	12	50
11	9.84321	13	9.98762	25	10.01238	9.85559	12	49
12	9.84334	13	9.98787	25	10.01213	9.85547	13	48
13	9.84347	13	9.98812	26	10.01188	9.85534	12	47
14	9.84360	13	9.98838	25	10.01162	9.85522	12	46
15	9.84373	12	9.98863	25	10.01137	9.85510	13	45
16	9.84385	13	9.98888	25	10.01112	9.85497	12	44
17	9.84398	13	9.98913	26	10.01087	9.85485	12	43
18	9.84411	13	9.98939	25	10.01061	9.85473	13	42
19	9.84424	13	9.98964	25	10.01036	9.85460	12	41
20	9.84437	13	9.98989	26	10.01011	9.85448	12	40
21	9.84450	13	9.99015	25	10.00985	9.85436	13	39
22	9.84463	13	9.99040	25	10.00960	9.85423	12	38
23	9.84476	13	9.99065	25	10.00935	9.85411	12	37
24	9.84489	13	9.99090	26	10.00910	9.85399	13	36
25	9.84502	13	9.99116	25	10.00884	9.85386	12	35
26	9.84515	13	9.99141	25	10.00859	9.85374	13	34
27	9.84528	12	9.99166	25	10.00834	9.85361	12	33
28	9.84540	13	9.99191	26	10.00809	9.85349	12	32
29	9.84553	13	9.99217	25	10.00783	9.85337	13	31
30	9.84566		9.99242		10.00758	9.85324		30
	Coſ.		Cot.		Tang.	Sin.		

45 Degrees.

44 Degrees.

′	Sin.	D.	Tang.	D.	Cot.	Coſ.	D.	′
30	9.84566	13	9.99242	25	10.00758	9.85324	12	30
31	9.84579	13	9.99267	26	10.00733	9.85312	13	29
32	9.84592	13	9.99293	25	10.00707	9.85299	12	28
33	9.84605	13	9.99318	25	10.00682	9.85287	13	27
34	9.84618	12	9.99343	25	10.00657	9.85274	12	26
35	9.84630	13	9.99368	26	10.00632	9.85262	12	25
36	9.84643	13	9.99394	25	10.00606	9.85250	13	24
37	9.84656	13	9.99419	25	10.00581	9.85237	12	23
38	9.84669	13	9.99444	25	10.00556	9.85225	13	22
39	9.84682	12	9.99469	26	10.00531	9.85212	12	21
40	9.84694	13	9.99495	25	10.00505	9.85200	13	20
41	9.84707	13	9.99520	25	10.00480	9.85187	12	19
42	9.84720	13	9.99545	25	10.00455	9.85175	13	18
43	9.84733	12	9.99570	26	10.00430	9.85162	12	17
44	9.84745	13	9.99596	25	10.00404	9.85150	13	16
45	9.84758	13	9.99621	25	10.00379	9.85137	12	15
46	9.84771	13	9.99646	26	10.00354	9.85125	13	14
47	9.84784	12	9.99672	25	10.00328	9.85112	12	13
48	9.84796	13	9.99697	25	10.00303	9.85100	13	12
49	9.84809	13	9.99722	25	10.00278	9.85087	13	11
50	9.84822	13	9.99747	26	10.00253	9.85074	12	10
51	9.84835	12	9.99773	25	10.00227	9.85062	13	9
52	9.84847	13	9.99798	25	10.00202	9.85049	12	8
53	9.84860	13	9.99823	25	10.00177	9.85037	13	7
54	9.84873	12	9.99848	26	10.00152	9.85024	12	6
55	9.84885	13	9.99874	25	10.00126	9.85012	13	5
56	9.84898	13	9.99899	25	10.00101	9.84999	13	4
57	9.84911	12	9.99924	25	10.00076	9.84986	12	3
58	9.84923	13	9.99949	26	10.00051	9.84974	13	2
59	9.84936	13	9.99975	25	10.00025	9.84961	12	1
60	9.84949		10.00000		10.00000	9.84949		0
	Coſ.		Cot.		Tang.	Sin.		

45 Degrees.

* * *

Logarithmic curve.

Plate CCXCVII. fig. 3.

LOGARITHMIC CURVE. If on the line AN both ways indefinitely extended, be taken AC, CE, EG, GI, IL. on the left hand; and alſo A g, g P, &c. on the right, all equal to one another; and if at the points P g, A, C, E, G, I, L, be erected to the right line AN, the perpendiculars PS, *g d*, AB, CD, EF, GH, IK, LM, which let be continually proportional, and repreſent numbers, viz. AB, 1; CD, 10; EF, 100, &c. then ſhall we have two progreſſions of lines, arithmetical and geometrical: for the lines AC, AE, AG, &c. are in arithmetical progreſſion, or as 1, 2, 3, 4, 5, &c. and ſo repreſent the logarithms to which the geometrical lines AB, CD, EF, &c. do correſpond. For ſince AG is triple of the firſt line AC, the number GH ſhall be in the third place from unity, if CD be in the firſt; ſo likewiſe ſhall LM be in the fifth place, ſince AL=5 AC. If the extremities of the proportionals S, *d*, B, D, F, &c. be joined by right lines, the figure SBML will become a polygon, conſiſting of more or leſs ſides, according as there are more or leſs terms in the progreſſion.

If the parts AC, CE, EG, &c. be biſected in the points *c*, *e*, *g*, *i*, *l*, and there be again raiſed the perpendiculars, *c d*, *e f*, *g h*, *i k*, *l m*, which are mean proportionals between AB, CD, CD, EF, &c. then there will ariſe a new ſeries of proportionals whoſe terms, beginning from that which immediately follows unity, are double of thoſe in the firſt ſeries, and the difference of the terms is become leſs, and approaches nearer to a ratio of equality than before. Likewiſe, in this new ſeries, the right lines AL, A *c*, expreſs the diſtances of the terms LM *c d*, from unity, viz. ſince AL is ten times greater than A *c*, LM ſhall be the tenth term of the ſeries from unity; and becauſe A *e* is three times greater than A *c*, *ef* will be the third term of the ſeries if *c d* be the firſt, and there ſhall be two mean proportionals between AB and *ef*, and between AB and LM there will be nine mean proportionals. And if the extremities of the lines B *d*, D *f*, F *h*, &c. be joined by right lines, there will be a new polygon made, conſiſting of more but ſhorter ſides than the laſt.

Logarithmic curve.

If, in this manner, mean proportionals be continually placed between every two terms, the number of terms at laſt will be made ſo great, as alſo the number of the ſides of the polygon, as to be greater than any given number, or to be infinite; and every ſide of the polygon ſo leſſened, as to become leſs than any given right line; and conſequently the polygon will be changed into a curve-lined figure; for any curve-lined figure may be conceived as a polygon, whoſe ſides are infinitely ſmall and infinite in number. A curve deſcribed after this manner is called *logarithmical*.

It is manifeſt from this deſcription of the logarithmic curve, that all numbers at equal diſtances are continually proportional. It is alſo plain, that if there be four numbers, AB, CD, IK, LM, ſuch that the diſtance between the firſt and ſecond be equal to the diſtance between the third and the fourth, let the diſtance from the ſecond to the third be what it will, theſe numbers will be proportional. For becauſe the diſtances AC, IL, are equal, AB ſhall be to the increment D*s*, as IK is to the increment MT. Wherefore, by compoſition, AB : DC : : IK : ML. And, contrariwiſe, if four numbers be proportional, the diſtance between the firſt and ſecond ſhall be equal to the diſtance between the third and fourth.

The diſtance between any two numbers is called *the logarithm of the ratio of thoſe numbers;* and, indeed, doth not meaſure the ratio itſelf, but the number of terms in a given ſeries of geometrical proportionals, proceeding from one number to another, and defines the number of equal ratios by the compoſition whereof the ratios of number is known.

Logarithmic Lines. For many mechanical purpoſes it is convenient to have the logarithms of numbers laid down on ſcales, as well as the logarithmic ſines and tangents; by which means computations may be carried on by mere menſuration with compaſſes. Lines of this kind are always put on the common Gunter's ſcale; but as theſe inſtruments muſt be extended to a very great length, in order to contain any conſiderable quantity of numbers, it becomes on object of importance to ſhorten them. Such an improvement has been made by Mr William Nicholſon, and publiſhed in the 77th volume of the Philoſophical Tranſactions. The principles on which the conſtruction of his inſtruments depends are as follow:

1. If two geometrical ſeries of numbers, having the ſame common ratio, be placed in order with the terms oppoſite to each other, the ratio between any term in one ſeries and its oppoſite in the other will be conſtant: Thus,

2 6 18 54 162, &c.
3 9 27 81 243, &c. Then,
2 3 6 9 18 27 54 81 162 243, &c.

where it is evident, that each of the terms in the upper ſeries is exactly two-thirds of the correſponding one in the lower.

2. The ratio of any two terms in one ſeries will be the ſame with that between thoſe which have an equal diſtance in the other.

3. In all ſuch geometrical ſeries as have the ſame ratio, the property above mentioned takes place, though we compare the terms of any ſeries with thoſe of another: Thus,

$$\begin{cases} 2 \quad 4 \quad 8 \quad 16 \quad 32 \quad 64, \text{\&c.} \\ 3 \quad 6 \quad 12 \quad 24 \quad 48 \quad 96, \text{\&c.} \end{cases}$$

$$\begin{cases} 4 \quad 8 \quad 16 \quad 32 \quad 64 \quad 128, \text{\&c.} \\ 5 \quad 10 \quad 20 \quad 40 \quad 80 \quad 160, \text{\&c.}; \end{cases}$$

where it is plain that 2, 4, 3, 6; alſo 2, 4, 4, 8, and 2, 4, 5, 10, &c. have the ſame ratio with that of each ſeries.

4. If the differences of the logarithms of the numbers be laid in order upon equidiſtant parallel right lines, in ſuch a manner that a right line drawn acroſs the whole ſhall interſect it at diviſions denoting numbers in geometrical progreſſion; then, from the condition of the arrangement, and the property of this logarithmic line, it follows, 1ſt, That every right line ſo drawn will, by its interſections, indicate a geometrical ſeries of numbers; 2dly, That ſuch ſeries as are indicated by theſe right lines will have the ſame common ratio; and, 3dly, That the ſeries thus indicated by two parallel right lines, ſuppoſed to move laterally, without changing either their mutual diſtance or paralleliſm to themſelves, will have each the ſame ratio and in all ſeries indicated by ſuch two lines, the ratio between an antecedent and conſequent; the former taken upon one line, and the latter upon another, will be alſo the ſame.

Plate CCXCVII. Fig. 11.

The 1ſt of theſe propoſitions is proved in the following manner. Let the lines AB, CD, EF, repreſent parts of the logarithmic line arranged according to the proportion already mentioned; and let GH be a right line paſſing through the points *e*, *c*, *a*, denoting numbers in geometrical progreſſion; then will any other line IK, drawn acroſs the arrangement, likewiſe paſs through three points *f*, *d*, *b*, in geometrical progreſſion. From one of the points of interſection *f* in the laſt-mentioned line IK, draw the line *fg* parallel to GH, and interſecting the arrangement in the points *i*, *h;* and the ratios of the numbers *e*, *f c i*, will be equal, as well as of *a h;* becauſe the intervals on the logarithmic line, or differences of the logarithms of thoſe numbers, are equal. Again, The point *f*, the line *i d*, and the line *hb*, are in arithmetical progreſſion denoting the differences between the logarithms of the numbers themſelves; whence the quotients of the numbers are in geometrical progreſſion.

The 2d propoſition is proved in a ſimilar manner. For as it was ſhown that the line *fg*, parallel to GH, paſſes through points of diviſion denoting numbers in the ſame continued ratio as thoſe indicated by the line GH; it may alſo be ſhown, that the line LM parallel to any other line IK, will paſs through a ſeries of points denoting numbers which have the ſame continued ratio with thoſe indicated by the line IK, to which it is parallel.

The 3d propoſition ariſes from the paralleliſm of the lines to their former ſituation; by which means they indicate numbers in a geometrical ſeries, having the ſame common ratio as before: their diſtance on the logarithmic line alſo remains unchanged; whence the differences between the logarithms of the oppoſite numbers, and of conſequence their ratios, will always be conſtant.

5. Suppoſing now an antecedent and conſequent to be given in any geometrical ſeries, it will always be poſſible to find them, provided the line be of unlimited length. Drawing two parallel lines, then, through each of the numbers, and ſuppoſing the lines to move without changing their direction or parallel ſituation, they will continually deſcribe new antecedents and conſequents in the ſame geometrical ſeries as before.

6. Though the logarithmic line contain no greater range of numbers than from 1 to 10, it will not be found neceſſary for the purpoſes of computation to repeat it. The only thing requiſite is to have a ſlider or beam with two fixed points at the diſtance of the interval betwixt 1 and 10, and a moveable point made to range betwixt them always to indicate the antecedent; then, if the conſequent fixed point fall with-

out the rule, the other fixed point will always denote the diviſion on which it would have fallen had the rule been prolonged; and this contrivance may eaſily be adapted to any arrangement of parallel lines whatever. The arrangement of right lines, however, ought always to be diſpoſed in ſuch a manner as to occupy a right-angled parallelogram, or the croſs line already mentioned ought always to be at right angles to the length of the ruler.

Fig. 7. is a ruler conſiſting of ten parallel lines.—Fig. 8. a beam-compaſs for meaſuring the intervals. B, A, C, are the parts which apply to the ſurface of the ruler; the middle one, A, being moveable ſidewiſe in a groove in the piece DE, ſo as always to preſerve its paralleliſm to the external pieces DC, which are fixed at a diſtance equal to the length of the ruler, and have their edges placed in ſuch a manner as to form with the parallel lines which they interſect a ratio, which by compoſition is $\frac{1}{1}$; which in the preſent caſe requires them to be at right angles to the length. The piece DE is applied to the edge FG of the ruler. The edges or borders H, I, K, L, are more conveniently made of tranſparent horn, or tortoiſe-ſhell, than of any opaque matter.

In uſing this ruler, apply the edge of either B or C to the conſequent, and ſlide the piece A to the antecedent; obſerving the difference between the numbers on the pieces denoting the lines they are found on: then, applying the ſame edge of A to any other antecedent, the other piece B or C will interſect a conſequent in the ſame ratio upon that line, having the ſame ſituation with regard to the antecedent that the line of the former conſequent had to its antecedent. But if B be the conſequent piece, and fall without the ruler, the piece C will ſhow the conſequent one line lower; or if C, in like manner, fall without the ruler, then B will ſhow the conſequent one line higher.—"It might be convenient (ſays Mr Nicholſon) for the purpoſe of computation, to make inſtruments of this kind with one hundred or more lines: but in the preſent inſtrument, the numbers on the pieces will anſwer the ſame purpoſe; for if a conſequent fall upon a line at any given number of intervals without the ruler, it will be found on that line of the arrangement which occupies the ſame number of intervals reckoned inwards from the oppoſite edge of the ruler."

Fig. 9. is an inſtrument on the plan of a Gunter's ſcale of $28\frac{1}{2}$ inches long, invented by Mr Robertſon. There is a moveable piece AB in the ſlider GH, acroſs which is drawn a fine line; the ſlider having alſo lines CD, EF, drawn acroſs it at diſtances from each other equal to the length of the ruler AB. In uſing the inſtrument, the line CD or EF is to be placed at the conſequent, and the line in AB at the antecedent: then, if the piece AB be placed at any other antecedent, the ſame line CD or EF will indicate its conſequent in the ſame ratio taken the ſame way: that is, if the antecedent and conſequent lie on the ſame ſide of the ſlider, all other antecedents and conſequents in that ratio will be in the ſame manner; and the contrary if they do not. But if the conſequent line fall without the rule, the other fixed line on the ſlider will ſhow the conſequent, but on the contrary ſide of the ſlider to that where it would elſe have been ſeen by means of the firſt conſequent line.

Fig. 10. is a circular inſtrument equivalent to the former; conſiſting of three concentric circles engraved and graduated upon a plate of an inch and a half diameter. Two legs A and B proceed from the centre, having right-lined edges in the direction of radii; and are moveable either ſingly or together. In uſing the inſtrument, place one of the edges at the antecedent and the other at the conſequent, and fix them at the angle. Move the two legs then together; and having placed the antecedent leg at any other number, the other will give the conſequent one in the like poſition on the lines. If the line CD happen to lie between the legs, and B be the conſequent leg, the number ſought will be found one line farther from the centre than it would otherwiſe have been; and on the contrary, it will be found one line nearer in the like caſe, if A be the conſequent leg. "This inſtrument (ſays Mr Nicholſon), differing from that repreſented fig. 7. only in its circular form, and the advantages reſulting from that form, the lines muſt be taken to ſucceed each other in the ſame manner laterally; ſo that numbers which fall either within or without the arrangement of circles, will be found on ſuch lines of the arrangement as would have occupied the vacant places if the ſucceſſion of lines had been indefinitely repeated ſidewiſe.

"I approve of this conſtruction as ſuperior to every other which has yet occurred to me, not only in point of convenience, but likewiſe in the probability of being better executed; becauſe ſmall arcs may be graduated with very great accuracy, by diviſions transferred from a larger original. The inſtrument, fig. 7. may be contained conveniently in a circle of about four inches and a half diameter.

"The circular inſtrument is a combination of the Gunter's line and the ſector, with the improvements here pointed out. The property of the ſector may be uſeful in magnifying the differences of the logarithms in the upper parts of the line of ſines, the middle of the tangents, and the beginning of the verſed ſines. It is even poſſible, as mathematicians will eaſily conceive, to draw ſpirals, on which graduations of parts, everywhere equal to each other, will ſhow the ratios of thoſe lines by moveable radii, ſimilar to thoſe in this inſtrument."

LOGIC.

LOGIC is the art of thinking and reaſoning juſtly; or, it may be defined the ſcience or hiſtory of the human mind, inaſmuch as it traces the progreſs of our knowledge from our firſt and moſt ſimple conceptions through all their different combinations, and all thoſe numerous deductions that reſult from variouſly comparing them one with another.

The preciſe buſineſs of logic therefore is, To explain the nature of the human mind, and the proper manner of conducting its ſeveral powers, in order to the attainment

Of Perception.

ment of truth and knowledge. It lays open thoſe errors and miſtakes we are apt, through inattention, to run into; and teaches us how to diſtinguiſh between truth, and what only carries the appearance of it. By theſe means we grow acquainted with the nature and force of the underſtanding; ſee what things lie within its reach; where we may attain certainty and demonſtration; and when we muſt be contented with probability.

Of Perception.

This ſcience is generally divided into four parts, viz. *Perception*, *Judgement*, *Reaſoning*, and *Method*. This diviſion comprehends the whole hiſtory of the ſenſations and operations of the human mind.

PART I. OF PERCEPTION.

WE find ourſelves ſurrounded with a variety of objects, which acting differently upon our ſenſes, convey diſtinct impreſſions into the mind, and thereby rouſe the attention and notice of the underſtanding. By reflecting too on what paſſes within us, we become ſenſible of the operations of our own minds, and attend to them as a new ſet of impreſſions. But in all this there is only bare *conſciouſneſs*. The mind, without proceeding any farther, takes notice of the impreſſions that are made upon it, and views things in order, as they preſent themſelves one after another. This attention of the underſtanding to the object acting upon it, whereby it becomes ſenſible of the impreſſions they make, is called by logicians *perception;* and the notices themſelves, as they exiſt in the mind, and are there treaſured up to be the materials of thinking and knowledge, are diſtinguiſhed by the name of *ideas*. In the article METAPHYSICS it ſhall be ſhown at large, how the mind, being furniſhed with ideas, contrives to diverſify and enlarge its ſtock: we have here chiefly to conſider the means of making known our thoughts to others; that we may not only underſtand how knowledge is acquired, but alſo in what manner it may be communicated with the greateſt certainty and advantage.

CHAP. I. *Of Words, conſidered as the ſigns of our Ideas.*

1
Words furniſh the means of recording our own thoughts;

I. OUR ideas, though manifold and various, are nevertheleſs all within our own breaſts, inviſible to others, nor can of themſelves be made appear. But God, deſigning us for ſociety, and to have fellowſhip with thoſe of our kind, has provided us with organs fitted to frame articulate ſounds, and given us alſo a capacity of uſing thoſe ſounds as ſigns of internal conceptions. Hence ſpring words and language: for, having once pitched upon any ſound to ſtand as the mark of an idea in the mind, cuſtom by degrees eſtabliſhes ſuch a connexion between them, that the appearance of the idea in the underſtanding always brings to our remembrance the ſound or name by which it is expreſſed; as in like manner the hearing of the ſound never fails to excite the idea for which it is made to ſtand. And thus it is eaſy to conceive how a man may record his own thoughts, and bring them again into view in any ſucceeding period of life. For this connexion being once ſettled, as the ſame ſounds will always ſerve to excite the ſame ideas; if he can but contrive to regiſter his words in the order and diſpoſition in which the preſent train of his thoughts preſent themſelves to his imagination, it is evident he will be able to recal theſe thoughts at pleaſure, and that too in the very manner of their firſt appearance. Accordingly we find, that the inventions of writing and printing, by enabling us to fix and perpetuate ſuch periſhable things as ſounds, have alſo furniſhed us with the means of giving a kind of permanency to the tranſactions of the mind, inſomuch that they may be in the ſame manner ſubjected to our review as any other objects of nature.

2
and of the mutual communication of knowledge from one man to another.

II. But beſides the ability of recording our own thoughts, there is this farther advantage in the uſe of external ſigns, that they enable us to communicate our thoughts to *others*, and alſo to receive information of what paſſes in *their* breaſts. For any number of men, having agreed to eſtabliſh the ſame ſounds as ſigns of the ſame ideas, it is apparent that the repetition of theſe ſounds muſt excite the like perceptions in each, and create a perfect correſpondence of thoughts. When, for inſtance, any train of ideas ſucceed one another in my mind, if the names by which I am wont to expreſs them have been annexed by thoſe with whom I converſe to the very ſame ſet of ideas, nothing is more evident, than that, by repeating thoſe names according to the tenor of my preſent conceptions, I ſhall raiſe in their minds the ſame courſe of thought as has taken poſſeſſion of my own. For by barely attending to what paſſes within themſelves upon hearing the ſounds which I repeat, they will alſo become acquainted with the ideas in my underſtanding, and have them in a manner laid before their view. So that we here clearly perceive how a man may communicate his ſentiments, knowledge, and diſcoveries to others, if the language in which he converſes be extenſive enough to mark all the ideas and tranſactions of his mind. But as this is not always the caſe, and men are often obliged to invent terms of their own to expreſs new views and conceptions of things; it may be aſked, how in theſe circumſtances we can become acquainted with the thoughts of another, when he makes uſe of words, to which we have never annexed any ideas, and that of courſe can raiſe no perceptions in our minds? In order to unveil this myſtery, and give ſome little inſight into the foundation, growth, and improvement of language, the following obſervations will be found of conſiderable moment.

3
Simple ideas cannot be conveyed into the mind by words, or a deſcription.

III. Firſt, That no word can be to any man the ſign of an idea, till that idea comes to have a real exiſtence in his mind. For names, being only ſo far intelligible as they denote known internal conceptions; where they have none ſuch to anſwer them, there they are plainly ſounds without ſignification, and of courſe convey no inſtruction or knowledge. But no ſooner are the ideas to which they belong raiſed in the underſtanding, than, finding it eaſy to connect them with the eſtabliſhed names, we can join in any agreement of this kind made by others, and thereby enjoy the benefit of their diſcoveries. The firſt thing therefore to be conſidered is, how theſe ideas may be conveyed into the mind; that being there, we may learn to connect them with their appropriated ſounds, and ſo become capable of underſtanding others when they make uſe of theſe ſounds in laying open and communicating their thoughts. Now, to comprehend this diſtinctly, it will be neceſſary to attend to the diviſion of our ideas into ſimple and complex, (ſee METAPHYSICS.) and firſt, as for our ſimple ideas; they can find no admiſſion into the mind, but by the two original fountains of knowledge, ſenſation and reflection. If therefore any of theſe have as yet no being in the underſtanding, it is impoſſible by words or a deſcription to excite them there. A man who had never felt the ſenſation of *heat*, could not be brought to comprehend that ſenſation by any thing we might ſay to explain it. If we would really produce the idea in him, it muſt be by applying the proper object to his ſenſes, and bringing him within the influence of a hot body. When this is done, and experience has taught him the perception to which men have annexed the name *heat*, it then becomes to him the ſign of that idea, and he thenceforth underſtands the meaning of the term, which, before, all the words in this world would not have been ſufficient to convey into his mind. The caſe is the ſame in reſpect of light and colours. A man born blind, and thereby deprived of the only conveyance for the ideas of this claſs, can never be brought to underſtand the names by which they are expreſſed. The reaſon is plain: they ſtand for ideas that have no exiſtence in his mind; and as the organ appropriated to their reception is wanting, all other contrivances are vain, nor can they by any force or deſcription be raiſed in his imagination. But it is quite otherwiſe in our complex notions. For theſe being no more than certain combinations of ſimple ideas, put together in various forms; if the original ideas out of which the collections are made have already got admiſſion into the underſtanding, and the names ſerving to expreſs them are known; it will be eaſy, by enumerating the ſeveral ideas concerned in the compoſition, and marking the order and manner in which they are united, to raiſe any complex conception in the mind. Thus the idea anſwering to the word *rainbow* may be readily excited in the imagination of another who has never ſeen the appearance itſelf, by barely deſcribing the figure, largeneſs, poſition, and order of colours; if we ſuppoſe theſe ſeveral ſimple ideas, with their names, ſufficiently known to him.

4
The names of complex ideas definable, thoſe of ſimple ideas not.

IV. And this leads to a ſecond obſervation upon this ſubject, namely, That words ſtanding for complex ideas are all definable, but thoſe by which we denote ſimple ideas are not; for ſimple ideas being ſecondary perceptions, which have no other entrance into the mind than by ſenſation or reflection, can only be got by experience, from the ſeveral objects of nature, proper to produce thoſe perceptions in us. Words indeed may very well ſerve to remind us of them, if they have already found admiſſion into the underſtanding, and their connexion with the eſtabliſhed names is known; but they can never give them their original being and exiſtence there. And hence it is, that when any one aſks the meaning of a word denoting a ſimple idea, we pretend not to explain it to him by a definition, well knowing that to be impoſſible; but, ſuppoſing him already acquainted with the idea, and only ignorant of the name by which it is called, we either mention it to him by ſome other name with which we preſume he knows its connexion, or appeal to the object where the idea itſelf is found. Thus, were any one to aſk the meaning of the word *white*, we ſhould tell him it ſtood for the ſame idea as *albus* in Latin, or *blanc* in French; or, if we thought him a ſtranger to theſe languages, we might appeal to an object producing the idea, by ſaying it denoted the colour we obſerve in *ſnow* or *milk*. But this is by no means a definition of the word, exciting a new idea in his underſtanding; but merely a contrivance to remind him of a known idea, and teach him its connexion with the eſtabliſhed name. For if the ideas after which he inquires have never yet been raiſed in his mind; as ſuppoſe one who had ſeen no other colours than *black* and *white*, ſhould aſk the meaning of the word *ſcarlet*; it is eaſy to perceive, that it would be no more poſſible to make him comprehend it by words, or a definition, than to introduce the ſame perception into the imagination of a man born blind. The only method in this caſe is, to preſent ſome object, by looking at which the perception itſelf may be excited; and thus he will learn both the name and the idea together.

5
Experien and obſervation bring men to an agreement in th names of ſimple ideas.

V. But how comes it to paſs that men agree in the names of their ſimple ideas, ſeeing they cannot view the perceptions in one another's minds, nor make known theſe perceptions by words to others? The effect is produced by experience and obſervation. Thus finding, for inſtance, that the name of *heat* is annexed to that ſenſation which men feel when they approach the fire, I make it alſo the ſign of the ſenſation excited in me by ſuch an approach, nor have any doubt but it denotes the ſame perception in my mind as in theirs. For we are naturally led to imagine, that the ſame objects operate alike upon the organs of the human body, and produce an uniformity of ſenſations. No man fancies, that the idea raiſed in him by the taſte of *ſugar*, and which he calls *ſweetneſs*, differs from that excited in another by the like means; or that *wormwood*, to whoſe reliſh he has given the epithet *bitter*, produces in another the ſenſation which he denotes by the word *ſweet*. Preſuming therefore upon this conformity of perceptions, when they ariſe from the ſame objects, we eaſily agree as to the names of our ſimple ideas: and if at any time, by a more narrow ſcrutiny into things, new ideas of this claſs come in our way, which we chooſe to expreſs by terms of our own invention; theſe names are explained, not by a definition, but by referring to the objects whence the ideas themſelves may be obtained.

6
The conveyance of complex ideas by definitions, a wiſe contr vance in n ture;

VI. Being in this manner furniſhed with ſimple ideas, and the names by which they are expreſſed; the meaning of terms that ſtand for complex ideas is eaſily got, becauſe the ideas themſelves anſwering to theſe terms may be conveyed into the mind by definitions. For our complex notions are only certain combinations of ſimple ideas. When therefore theſe are enumerated, and the manner in which they are united into one conception explained, nothing more is wanting to raiſe that conception in the underſtanding; and thus the term denoting it comes of courſe to be underſtood. And here it is worth while to reflect

Of erception. a little upon the wiſe contrivance of nature, in thus furniſhing us with the very apteſt means of communicating our thoughts. For were it not ſo ordered, that we could thus convey our complex ideas from one to another by definitions, it would in many caſes be impoſſible to make them known at all. This is apparent in thoſe ideas which are the proper work of the mind. For as they exiſt only in the underſtanding, and have no real objects in nature in conformity to which they are framed; if we could not make them known by deſcription, they muſt lie for ever hid within our own breaſts, and be confined to the narrow acquaintance of a ſingle mind. All the fine ſcenes that ariſe from time to time in the poet's fancy, and by his lively painting give ſuch entertainment to his readers, were he deſtitute of this faculty of laying them open to the view of others by words and deſcription, could not extend their influence beyond his own imagination, or give joy to any but the original inventor.

7 nd of reat avail owards the nprove- nent of nowledge. VII. There is this farther advantage in the ability we enjoy of communicating our complex notions by definitions; that as theſe make by far the largeſt claſs of our ideas, and moſt frequently occur in the progreſs and improvement of knowledge, ſo they are by theſe means imparted with the greateſt readineſs, than which nothing would tend more to the increaſe and ſpreading of ſcience: for a definition is ſoon peruſed; and if the terms of it are well underſtood, the idea itſelf finds an eaſy admiſſion into the mind. Whereas, in ſimple perceptions, where we are referred to the objects producing them, if theſe cannot be come at, as is ſometimes the caſe, the names by which they are expreſſed muſt remain empty ſounds. But new ideas of this claſs occurring very rarely in the ſciences, they ſeldom create any great obſtruction. It is otherwiſe with our complex notions; for every ſtep we take leading us into new combinations and views of things, it becomes neceſſary to explain theſe to others, before they can be made acquainted with our diſcoveries: and as the manner of definitions is eaſy, requiring no apparatus but that of words, which are always ready, and at hand; hence we can with the leſs difficulty remove ſuch obſtacles as might ariſe from terms of our own invention, when they are made to ſtand for new complex ideas ſuggeſted to the mind by ſome preſent train of thinking. And thus at laſt we are let into the myſtery hinted at in the beginning of this chapter, viz. how we may become acquainted with the thoughts of another, when he makes uſe of words to which we have as yet joined no ideas. The anſwer is obvious from what has been already ſaid. If the terms denote ſimple perceptions, he muſt refer us to theſe objects of nature whence the perceptions themſelves are to be obtained; but, if they ſtand for complex ideas, their meaning may be explained by a *definition*.

CHAP. II. *Of Definition.*

8 efinition fined. I. A DEFINITION *is the unfolding of ſome conception of the mind, anſwering to the word or term made uſe of as the ſign of it.* Now as, in exhibiting any idea to another, it is neceſſary that the deſcription be ſuch as may excite that preciſe idea in his mind; hence it is plain that definitions, properly ſpeaking, are not arbitrary, but confined to the repreſenting of certain determinate ſettled notions, ſuch namely as are annexed by the ſpeaker or writer to the words he uſes. As nevertheleſs it is univerſally allowed that the ſignification of words is perfectly voluntary, and not the effect of any natural and neceſſary connexion between them and the ideas for which they ſtand: ſome may perhaps wonder why definitions are not ſo too. In order therefore to unravel this difficulty, and ſhow diſtinctly what is and what is not arbitrary in ſpeech, we muſt carefully diſtinguiſh between the connexion of our words and ideas, and the unfolding of the ideas themſelves.

9 The connexion between words and ideas, a perfectly voluntary eſtabliſhment. II. Firſt, as to the connexion of our words and ideas; this, it is plain, is a purely arbitrary inſtitution. When, for inſtance, we have in our minds the idea of any particular ſpecies of metals, the calling it by the name *gold* is an effect of the voluntary choice of men ſpeaking the ſame language, and not of any peculiar aptneſs in that ſound to expreſs that idea. Other nations we find make uſe of different ſounds, and with the ſame effect. Thus *aurum* denotes that idea in Latin, and *or* in French; and even the word *gold* itſelf would have as well ſerved to expreſs the idea of that metal which we call *ſilver*, had cuſtom in the beginning eſtabliſhed it.

10 The deſcription of ideas not ſo, but bounded to the repreſentation of that preciſe appearance by which they are diſtinguiſhed among themſelves. III. But although we are thus entirely at liberty in connecting any idea with any ſound, yet it is quite otherwiſe in unfolding the ideas themſelves. For every idea having a preciſe appearance of its own, by which it is diſtinguiſhed from every other idea: it is manifeſt, that in laying it open to others, we muſt ſtudy ſuch a deſcription as ſhall exhibit that peculiar appearance. When we have formed to ourſelves the idea of a figure bounded by four equal ſides, joined together at right angles, we are at liberty to expreſs that idea by any ſound, and call it either a *ſquare* or a *triangle*. But whichever of theſe names we uſe, ſo long as the idea is the ſame, the deſcription by which we would ſignify it to another muſt be ſo too. Let it be called *ſquare* or *triangle*, it is ſtill a figure having four equal ſides, and all its angles right ones. Hence we clearly ſee what is and what is not arbitrary in the uſe of words. The eſtabliſhing any ſound as the mark of ſome determinate idea in the mind, is the effect of free choice, and a voluntary combination among men: and as different nations make uſe of different ſounds to denote the ſame ideas, hence proceeds all that variety of languages which we meet with in the world. But when a connexion between our ideas and words is once ſettled, the unfolding of the idea anſwering to any word, which properly conſtitutes a definition, is by no means an arbitrary thing: for here we are bound to exhibit that preciſe conception which either the uſe of language, or our own particular choice, hath annexed to the term we uſe.

11 Cauſes of the obſcurity that has hitherto perplexed the theory of definitions. IV. And thus it appears, that definitions, conſidered as deſcriptions of ideas in the mind, are ſteady and invariable, being bounded to the repreſentation of theſe preciſe ideas. But then, in the application of definitions to particular names, we are altogether left to our own free choice. Becauſe as the connecting of any idea with any ſound is a perfectly arbitrary inſtitution, the applying the deſcription of that idea to that ſound muſt be ſo too. When therefore logicians tell

us that the definition of the name is arbitrary, they mean no more than this; that as different ideas may be connected with any term, according to the good pleaſure of him that uſes it; in like manner may different deſcriptions be applied to the term, ſuitable to the ideas ſo connected. But this connexion being ſettled, and the term conſidered as the ſign of ſome fixed idea in the underſtanding, we are no longer left to arbitrary explications, but muſt ſtudy ſuch a deſcription as correſponds with that preciſe idea. Now this alone, according to what has been before laid down, ought to be accounted a definition. What ſeems to have occaſioned no ſmall confuſion in this matter, is, that many explanations of words, where no idea is unfolded, but merely the connexion between ſome word and idea aſſerted, have yet been dignified with the name of definitions. Thus, when we ſay that *a clock is an inſtrument by which we meaſure time;* that is by ſome called a definition; and yet it is plain that we are beforehand ſuppoſed to have an idea of this inſtrument, and only taught that the word *clock* ſerves in common language to denote that idea. By this rule all explications of words in our dictionaries will be definitions, nay, the names of even ſimple ideas may be thus defined. *White*, we may ſay, is the colour we obſerve in ſnow or milk; *heat* the ſenſation produced by approaching the fire; and ſo in innumerable other inſtances. But theſe, and all others of the like kind, are by no means definitions, exciting new ideas in the underſtanding, but merely contrivances to remind us of known ideas, and teach their connexion with the eſtabliſhed names.

12
Complex ideas alone capable of that kind of deſcription which goes by the name of a definition.

V. But now in definitions properly ſo called, we firſt conſider the term we uſe, as the ſign of ſome inward conception, either annexed to it by cuſtom, or our own free choice: and then the buſineſs of the definition is to unfold and explicate that idea. As therefore the whole art lies in giving juſt and true copies of our ideas; a definition is then ſaid to be made perfect, when it ſerves diſtinctly to excite the idea deſcribed in the mind of another, even ſuppoſing him before wholly unacquainted with it. This point ſettled, let us next inquire what thoſe ideas are which are capable of being thus unfolded? and in the firſt place it is evident, that all our ſimple ideas are neceſſarily excluded. We have ſeen already that experience alone is to be conſulted here, inſomuch that if either the objects whence they are derived come not in our way, or the avenues appointed by nature for their reception are wanting, no deſcription is ſufficient to convey them into the mind. But where the underſtanding is already ſupplied with theſe original and primitive conceptions, as they may be united together in an infinity of different forms; ſo may all their ſeveral combinations be diſtinctly laid open, by enumerating the ſimple ideas concerned in the various collections, and tracing the order and manner in which they are linked one to another. Now theſe combinations of ſimple notices conſtitute what we call our complex notions, whence it is evident, that complex ideas, and thoſe alone, admit of that kind of deſcription which goes by the name of a definition.

VI. Definitions, then, are pictures or repreſentations of our ideas; and as theſe repreſentations are then only poſſible when the ideas themſelves are complex, it is obvious to remark, that definitions cannot have place, but where we make uſe of terms ſtanding for ſuch complex ideas. But our complex ideas being, as we have ſaid, nothing more than different combinations of ſimple ideas; we then know and comprehend them perfectly, when we know the ſeveral ſimple ideas of which they conſiſt, and can ſo put them together in our minds as may be neceſſary towards the framing of that peculiar connexion which gives every idea its diſtinct and proper appearance.

13
Two things required in a definition to enumerate the ideas and explain the manner of their combinations.

VII. Two things are therefore required in every definition: firſt, That all the original ideas, out of which the complex one is formed, be diſtinctly enumerated; and, ſecondly, That the order and manner of combining them into one conception be clearly explained. Where a definition has theſe requiſites, nothing is wanting to its perfection; becauſe every one who reads it and underſtands the terms, ſeeing at once what ideas he is to join together, and alſo in what manner, can at pleaſure form in his own mind the complex conception anſwering to the term defined. Let us, for inſtance, ſuppoſe the word *ſquare* to ſtand for that idea by which we repreſent to ourſelves a figure whoſe ſides ſubtend quadrants of a circumſcribed circle. The parts of this idea are the ſides bounding the figure. Theſe muſt be four in number, and all equal among themſelves, becauſe they are each to ſubtend a fourth part of the ſame circle. But, beſides theſe component parts, we muſt alſo take notice of the manner of putting them together, if we would exhibit the preciſe idea for which the word *ſquare* here ſtands. For four equal right lines, anyhow joined, will not ſubtend quadrants of a circumſcribed circle. A figure with this property muſt have its ſides ſtanding alſo at right angles. Taking in therefore this laſt conſideration reſpecting the manner of combining the parts, the idea is fully deſcribed, and the definition thereby rendered complete. For a figure bounded by four equal ſides, joined together at right angles, has the property required; and is moreover the only right-lined figure to which that property belongs.

14
How we are to proceed to arrive at juſt and adequate definitions.

VIII. It will now be obvious to every one, in what manner we ought to proceed, in order to arrive at juſt and adequate definitions. Firſt, We are to take an exact view of the idea to be deſcribed, trace it to its original principles, and mark the ſeveral ſimple perceptions that enter into the compoſition of it. Secondly, We are to conſider the particular manner in which theſe elementary ideas are combined, in order to the forming of that preciſe conception for which the term we make uſe of ſtands. When this is done, and the idea wholly unravelled, we have nothing more to do than fairly tranſcribe the appearance it makes to our own minds. Such a deſcription, by diſtinctly exhibiting the order and number of our primitive conceptions, cannot fail to excite at the ſame time in the mind of every one that reads it, the complex idea reſulting from them; and therefore attains the true and proper end of a definition.

CHAP. III. *Of the Compoſition and Reſolutions of our our Ideas, and the Rules of Definition thence ariſing.*

I. THE rule laid down in the foregoing chapter is general, extending to all poſſible caſes; and is indeed that to which alone we can have recourſe, where any doubt or difficulty ariſes. It is not, however, neceſſary that we ſhould practiſe it in every particular inſtance. Many of our ideas are extremely complicated, inſomuch that to enumerate all the ſimple perceptions out of which they are formed, would be a very troubleſome and tedious work. For this reaſon logicians have eſtabliſhed certain compendious rules of defining, of which it may not be amiſs here to give ſome account. But in order to the better underſtanding of what follows, it will be neceſſary to obſerve, that there is a certain gradation in the compoſition of our ideas. The mind of man is very limited in its views, and cannot take in a great number of objects at once. We are therefore fain to proceed by ſteps, and make our firſt advances ſubſervient to thoſe which follow. Thus, in forming our complex notions, we begin at firſt with but a few ſimple ideas, ſuch as we can manage with eaſe, and unite them together into one conception. When we are provided with a ſufficient ſtock of theſe, and have by habit and uſe rendered them familiar to our minds, they become the component parts of other ideas ſtill more complicated, and form what we may call a ſecond order of compound notions. This proceſs, as is evident, may be continued to any degree of compoſition we pleaſe, mounting from one ſtage to another, and enlarging the number of combinations.

15 In compounding our ideas, we proceed by a ſucceſſive gradation.

16 Hence ideas of this claſs beſt comprehended, when we advance gradually through all the ſeveral orders.

II. But now in a ſeries of this kind, whoever would acquaint himſelf perfectly with the laſt and higheſt order of ideas, finds it much the moſt expedient method to proceed gradually through all the intermediate ſteps. For, were he to take any very compound idea to pieces, and, without regard to the ſeveral claſſes of ſimple perceptions that have already been formed into diſtinct combinations, break it at once into its original principles, the number would be ſo great as perfectly to confound the imagination, and overcome the utmoſt reach and capacity of the mind. When we ſee a prodigious multitude of men jumbled together in crowds, without order or any regular poſition, we find it impoſſible to arrive at an exact knowledge of their number. But if they are formed into ſeparate battalions, and ſo ſtationed as to fall within the leiſure ſurvey of the eye; by viewing them ſucceſſively and in order, we come to an eaſy and certain determination. It is the ſame in our complex ideas. When the original perceptions, out of which they are framed, are very numerous, it is not enough that we take a view of them in looſe and ſcattered bodies; we muſt form them into diſtinct claſſes, and unite theſe claſſes in a juſt and orderly manner, before we can arrive at a true knowledge of the compound notices reſulting from them.

17 Our definitions ſhould keep pace with our ideas, and obſerve a like gradation.

III. This gradual progreſs of the mind to its compound notions, through a variety of intermediate ſteps, plainly points out the manner of conducting the definitions by which theſe notions are conveyed into the minds of others. For as the ſeries begins with ſimple and eaſy combinations, and advances through a ſucceſſion of different orders, riſing one above another in the degree of compoſition, it is evident, that, in a train of definitions expreſſing theſe ideas, a like gradation is to be obſerved. Thus the complex ideas of the loweſt order can no otherwiſe be deſcribed than by enumerating the ſimple ideas out of which they are made, and explaining the manner of their union. But then in the ſecond, or any other ſucceeding order, as they are formed out of thoſe gradual combinations, and conſtitute the inferior claſſes, it is not neceſſary, in deſcribing them, to mention one by one all the ſimple ideas of which they conſiſt. They may be more diſtinctly and briefly unfolded, by enumerating the compound ideas of a lower order, from whoſe union they reſult, and which are all ſuppoſed to be already known in conſequence of previous definitions. Here then it is that the logical method of defining takes place; which, that it may be the better underſtood, we ſhall explain ſomewhat more particularly the ſeveral ſteps and gradations of the mind in compounding its ideas, and thence deduce that peculiar form of a definition which logicians have thought fit to eſtabliſh.

18 The ſteps by which the mind proceeds from particular to general ideas.

IV. All the ideas we receive from the ſeveral objects of nature that ſurround us, repreſent diſtinct individuals. Theſe individuals, when compared together, are found in certain particulars to reſemble each other. Hence, by collecting the reſembling particulars into one conception, we form the notion of a *ſpecies*. And here let it be obſerved, that this laſt idea is leſs complicated than that by which we repreſent any of the particular objects contained under it. For the idea of the ſpecies excludes the peculiarities of the ſeveral individuals, and retains only ſuch properties as are common to them all. Again, By comparing ſeveral ſpecies together, and obſerving their reſemblance, we form the idea of a *genus*; where, in the ſame manner as before, the compoſition is leſſened, becauſe we leave out what is peculiar to the ſeveral ſpecies compared, and retain only the particulars wherein they agree. It is eaſy to conceive the mind proceeding thus from one ſtep to another, and advancing through its ſeveral claſſes of general notions, until at laſt it comes to the higheſt genus of all, denoted by the word *being*, where the bare idea of exiſtence is only concerned.

19 The conduct of the mind in compounding its ideas, as it advances through the different orders of perception.

V. In this procedure we ſee the mind unravelling a complex idea, and tracing it in the aſcending ſcale, from greater or leſs degrees of compoſition, until it terminates in one ſimple perception. If now we take the ſeries the contrary way, and, beginning with the laſt or higheſt genus, carry our view downwards, through all the inferior genera and ſpecies, quite to the individuals, we ſhall thereby arrive at a diſtinct apprehenſion of the conduct of the underſtanding in compounding its ideas. For, in the ſeveral claſſes of our perceptions, the higheſt in the ſcale is for the moſt part made up of but a few ſimple ideas, ſuch as the mind can take in and ſurvey with eaſe. This firſt general notion, when branched out into the different ſubdiviſions contained under it, has in every one of them ſomething peculiar, by which they are diſtinguiſhed among themſelves; inſomuch that, in deſcending from the genus to the ſpecies, we always ſuperadd ſome new idea, and thereby increaſe the degree of compoſition. Thus the idea denoted by the word *figure* is of a very general nature, and compoſed of but few ſimple perceptions, as implying no more than ſpace everywhere bounded. But if we deſcend farther, and conſider the boundaries of this ſpace, as that they may be either lines or ſurface, we

call

fall into the ſeveral ſpecies of figure. For where the ſpace is bounded by one or more ſurfaces, we give it the name of a *ſolid figure*; but where the boundaries are lines, it is called a *plain figure* (A).

27
The idea of the ſpecies formed by ſuperadding the ſpecific difference to the genus.

VI. In this view of things it is evident, that the ſpecies is formed by ſuperadding a new idea to the genus. Here, for inſtance, the genus is circumſcribed ſpace. If now to this we ſuperadd the idea of a circumſcription by lines, we frame the notion of that ſpecies of figures which are called *plain*; but if we conceive the circumſcription to be by ſurfaces, we have the ſpecies of ſolid figures. This ſuperadded idea is called the *ſpecific difference*, not only as it ſerves to divide the ſpecies from the genus, but becauſe, being different in all the ſeveral ſubdiviſions, we thereby alſo diſtinguiſh the ſpecies one from another. And as it is likewiſe that conception, which, by being joined to the general idea, completes the notion of the ſpecies: hence it is plain, that the genus and ſpecific difference are to be conſidered as the proper and conſtituent parts of the ſpecies. If we trace the progreſs of the mind ſtill farther, and obſerve it advancing through

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(A) This account of the compoſition and reſolution of our ideas is agreeable to the common doctrine of logicians on the ſubject. Into the truth of the doctrine itſelf we ſhall inquire afterwards under the article METAPHYSICS: but to prevent miſtakes, it may be proper to obſerve here, that though every writer of logic has treated largely of *general* and *ſpecific ideas*, there is in reality nothing *general* in the matter but the *terms of language*. When we utter, for inſtance, the word *triangle*, that *general term* does not, as has been often ſaid, ſuggeſt to the mind the *general idea* of a triangle, which is neither *oblique* nor *rectangle*, neither *equilateral* nor *ſcalenon*, &c. for *ſuch* a triangle, as it cannot *exiſt* in *nature*, cannot be *conceived* in *idea*. In like manner, the *general term Virtue* does not excite a general *idea* of *virtue*, which is neither *prudence*, nor *temperance*, nor *fortitude*, nor *juſtice*, nor *charity*, &c. for that which is *diſtinct* from *all theſe* is not *virtue*. What then is the import of ſuch *general terms?* The anſwer is obvious: they denote *claſſes of objects*; and are never uſed without ſome word of limitation, but when ſomething that has no dependence upon the *particular qualities*, which diſtinguiſh the individuals from each other, is affirmed or denied of the whole claſs. Thus we may affirm, that the *three angles of a plain triangle are equal to two right angles*: and this propoſition is demonſtrably true, *not* of a triangle, which is neither *oblique* nor *rectangle*, neither *equilateral* nor *ſcalenon*, for ſuch a triangle never was conceived; but of *all theſe* triangles equally, as the truth of the propoſition and the progreſs of the demonſtration has no dependence upon the *peculiarities* which *diſtinguiſh* theſe triangles from one another. Again, When we ſay that *a man of virtue will be rewarded by God*, we do not mean by the word *virtue* a *general idea* making part of each of the complex and more *particular* ideas of *prudence*, *fortitude*, *juſtice*, &c. and at the ſame time *different* from them all; but we affirm, that the man who practiſes *any* or *all* of theſe virtues, according as he has opportunity, will be rewarded by God.

The hiſtory of our ideas is ſhortly this:—That act of the mind, if it may be called an *act*, which makes known an *external object*, is termed PERCEPTION. That act of the mind which makes known an *internal object*, is termed CONSCIOUSNESS. Objects once perceived may be recalled to the mind by the power of *memory*; and when they are ſo recalled, we have a perception of them in all reſpects ſimilar to the original perception, only leſs diſtinct: we fancy *ourſelves* in the *ſame place*, and the *object perceived* attended by the *ſame circumſtances*. This indiſtinct *ſecondary perception* of an object is termed an IDEA; and therefore the preciſe and accurate definition of an *idea*, in contradiſtinction to an *original perception*, is "that perception of a real object which is raiſed in the mind by the power of memory." Now all our *original perceptions* being of *particular objects*, it is obvious that our *ideas*, which are only thoſe perceptions recalled, muſt be of *particular objects likewiſe*, and that no man can have an *idea* of a thing of which the *real exiſtence* is contradictory and impoſſible. But the *general* and *ſpecific ideas* of logicians, are ideas of *nothing which exiſts*, or *which can poſſibly exiſt*. They are acquired, we are told, by *abſtraction*, in the following manner. Among a number of individuals we perceive certain qualities the ſame in all, whilſt in each individual there are other qualities which have nothing ſimilar to them in any other individual: now the mind, it is ſaid, has a power of abſtracting the *particular qualities of each individual* from *thoſe* which are *common to the whole*, and of theſe laſt forming a *general idea* of the whole claſs. Thus all men have nearly the *ſame form*; and they have each *ſome ſtature* and *ſome colour*, though there are not perhaps two individuals who have *preciſely the ſame ſtature* and the *ſame colour*. Now, ſay the advocates for general ideas, if we *abſtract* what is *peculiar* to *each individual*, and retain what is *common* to the *whole race*, we have the *general idea* ſignified by the word *man*. That is, if we conceive a being in human ſhape, which is of *ſtature* and *colour*, but neither *tall* nor *ſhort*, neither *white* nor *black*, nor *red* nor *brown*, nor *any other colour which we ever ſaw*, we have the *general idea* of *humanity*, and underſtand the meaning of the *word man!* Surely no perſon who is not the ſlave of prejudice will pretend that he can frame ſuch an idea as this—the idea of an object which cannot poſſibly exiſt in nature.

By this we do not mean to affirm, that we cannot frame ideas of ſuch objects as have *no real exiſtence*; for it is as eaſy to imagine a man with *ten heads* as *with one*, becauſe there is nothing contradictory between *ten heads* and *one body*. But *figure*, which is ſaid to be ſpace bounded *neither by lines nor ſuperficies*; *colour*, which is neither *red* nor *white*, nor *blue* nor *black*, &c.; and *animal*, which is neither *man*, *beaſt*, *bird*, nor *inſect*; are impoſſible in nature, and inconceivable in idea. There is, however, no harm in ſtill retaining the phraſe *general idea*, provided the perſon who uſes it takes care to let it be known, that by theſe words he means not any *abſtract* and *general conception*, but merely a *claſs of real objects*. The phraſe may at times prevent much circumlocution; for which reaſon we have retained the uſe of it in the text.

through the inferior ſpecies, we ſhall find its manner of proceeding to be always the ſame. For every lower ſpecies is formed by ſuperadding ſome new idea to the ſpecies next above it; inſomuch that in this deſcending ſcale of our perceptions, the underſtanding paſſes through different orders of complex notions, which become more and more complicated at every ſtep it takes. Let us reſume here, for inſtance, the ſpecies of plain figures. They imply no more than ſpace bounded by lines. But if we take in an additional conſideration of the nature of theſe lines, as whether they are *right* or *curves*, we fall into the ſubdiviſions of plain figure, diſtinguiſhed by the names of *rectilinear*, *curvilinear*, and *mixtilinear*.

21 And in all the inferior ſpecies by ſuperadding the ſpecific difference to the neareſt genus.

VII. And here we are to obſerve, that though plain figures, when conſidered as one of thoſe branches that come under the notions of figure in general, take the name of a ſpecies; yet compared with the claſſes of curvilinear, rectilinear, and mixtilinear, into which they themſelves may be divided, they really become a genus, of which the beforementioned ſubdiviſions conſtitute the ſeveral ſpecies. Theſe ſpecies, in the ſame manner as in the caſe of plane and ſolid figures, conſiſt of the genus and ſpecific difference as their conſtituent parts. For in the curvilinear kind, the curvity of the lines bounding the figure makes what is called the *ſpecific difference;* to which if we join the genus, which here is a plain figure or ſpace circumſcribed by lines, we have all that is neceſſary towards completing the notion of this ſpecies. We are only to take notice, that this laſt ſubdiviſion, having two genera above it, viz. plain figure, and figure in general; the genus joined with the ſpecific difference, in order to conſtitute the ſpecies of curvilinears, is that which lies neareſt to the ſaid ſpecies. It is the notion of plain figure, and not of figure in general, that joined with the idea of curvity, makes up the complex conception of curve-lined figures. For in this deſcending ſcale of our ideas, figure in general, plain figures, curved-lined figures, the two firſt are conſidered as genera in reſpect of the third; and the ſecond in order, or that which ſtands next to the third, is called the *neareſt genus*. But now as it is this ſecond idea, which, joined with the notion of curvity, forms the ſpecies of curve-lined figures; it is plain, that the third or laſt idea in the ſeries is made up of the neareſt genus and ſpecific difference. This rule holds invariably, however far the ſeries is continued; becauſe, in a train of ideas thus ſucceeding one another, all that precede the laſt are conſidered as ſo many genera in reſpect of that laſt; and the laſt itſelf is always formed by ſuperadding the ſpecific difference to the genus next it.

22 The idea of any individual compoſed of the loweſt ſpecies and numeric difference.

VIII. Here then we have an univerſal deſcription, applicable to all our ideas of whatever kind, from the higheſt genus to the loweſt ſpecies. For, taking them in order downwards from the ſaid general idea, they everywhere conſiſt of the *genus proximum*, and *differentia ſpecifica*, as logicians love to expreſs themſelves. But when we come to the loweſt ſpecies of all, comprehending under it only individuals, the ſuperadded idea, by which theſe individuals are diſtinguiſhed one from another, no longer takes the name of the ſpecific difference. For here it ſerves not to denote diſtinct ſpecies, but merely a variety of individuals, each of which, having a particular exiſtence of its own, is therefore numerically different from every other of the ſame kind. And hence it is, that in this laſt caſe, logicians chooſe to call the ſuperadded idea by the name of the *numerical difference;* inſomuch that, as the idea of a ſpecies is made up of the neareſt genus and ſpecific difference, ſo the idea of an individual conſiſts of the loweſt ſpecies and numeric difference. Thus the circle is a ſpecies of curve-lined figures, and what we call the *loweſt ſpecies*, as comprehending under it only individuals. Circles in particular are diſtinguiſhed from one another by the length and poſition of their diameters. The length therefore and poſition of the diameter of a circle form what logicians call the *numerical difference;* becauſe, theſe being given, the circle itſelf may be deſcribed, and an individual thereby conſtituted.

23 Definitions to follow one another in train and paſs through the ſame ſucceſſive gradations as our compound ideas.

IX. Thus the mind, in compounding its ideas, begins, we ſee, with the moſt general notions, which, conſiſting of but a few ſimple notices, are eaſily combined and brought together into one conception. Thence it proceeds to the ſpecies comprehended under this general idea; and theſe are formed by joining together the genus and ſpecific difference. And as it often happens, that theſe ſpecies may be ſtill farther ſubdivided, and run on in a long ſeries of continued gradations, producing various orders of compound perceptions; ſo all theſe ſeveral orders are regularly and ſucceſſively formed by annexing in every ſtep the ſpecific difference to the neareſt genus. When by this method of procedure we are come to the loweſt order of all, by joining the ſpecies and numeric difference, we frame the ideas of individuals. And here the ſeries neceſſarily terminates, becauſe it is impoſſible any farther to bound or limit our conceptions. This view of the compoſition of our ideas, repreſenting their conſtituent parts in every ſtep of the progreſſion, naturally points out the true and genuine form of a definition. For as definitions are no more than deſcriptions of the ideas for which the terms defined ſtand: and as ideas are then deſcribed, when we enumerate diſtinctly and in order the parts of which they conſiſt; it is plain, that by making our definitions follow one another according to the natural train of our conceptions, they will be ſubject to the ſame rules, and keep pace with the ideas they deſcribe.

24 The form of a definition in all the various orders of conception.

X. As therefore the firſt order of our compound notions, or the ideas that conſtitute the higheſt genera in the different ſcales of perception, are formed by uniting together a certain number of ſimple notices; ſo the terms expreſſing theſe genera are defined *by enumerating the ſimple notices ſo combined.* And as the ſpecies comprehended under any genus, or the complex ideas of the ſecond order, ariſe from ſuperadding the ſpecific difference to the ſaid general idea; ſo the definition of the names of the ſpecies is abſolved, in a detail of the ideas of the ſpecific difference, connected with the term of the genus. For the genus having been before defined, the term by which it is expreſſed ſtands for a known idea, and may therefore be introduced into all ſubſequent definitions, in the ſame manner as the names of ſimple perceptions. It will now be ſufficiently obvious, that the definitions of all the ſucceeding orders of compound notions will everywhere conſiſt of the term of the neareſt genus, joined with an enumeration of the ideas that conſtitute the ſpecific difference; and that the definition of individuals unites the name of the loweſt ſpecies with the terms by which we expreſs the ideas of the numeric difference.

XI. Here then we have the true and proper form of a definition, in all the various orders of conception. This is that method of defining which is commonly called *logical*, and which we ſee is perfect in its kind, inaſmuch as it preſents a full and adequate deſcription of the idea for which the term defined ſtands.

PART II. OF JUDGEMENT.

CHAP. I. *Of the Grounds of Human Judgement.*

25 Intuition reſpects the relations between our ideas when they are immediately perceivable.

THE mind being furniſhed with ideas, its next ſtep in the way to knowledge is, the comparing theſe ideas together, in order to judge of their agreement or diſagreement. In this joint view of our ideas, if the relation is ſuch as to be immediately diſcoverable by the bare inſpection of the mind, the judgements thence obtained are called *intuitive*, from a word that denotes *to look at;* for in this caſe, a mere attention to the ideas compared ſuffices to let us ſee now far they are connected or disjoined. Thus, *that the Whole is greater than any of its Parts*, is an intuitive judgement; nothing more being required to convince us of its truth, than an attention to the ideas of *whole* and *part*. And this too is the reaſon why we call the act of the mind forming theſe judgements *intuition;* as it is indeed no more than an immediate perception of the agreement or diſagreement of any two ideas.

26 Experience and teſtimony the ground of judging as to facts.

II. But here it is to be obſerved, that our knowledge of this kind reſpects only our ideas, and the relations between them; and therefore can ſerve only as a foundation to ſuch reaſonings as are employed in inveſtigating thoſe relations. Now it ſo happens, that many of our judgements are converſant about facts, and and the real exiſtence of things which cannot be traced by the bare contemplation of our ideas. It does not follow, becauſe I have the idea of a circle in my mind, that therefore a figure anſwering to that idea has a real exiſtence in nature. I can form to myſelf the notion of a centaur or golden mountain, but never imagine on that account that either of them exiſts. What then are the grounds of our judgement in relation to facts? *experience and teſtimony*. By experience we are informed of the exiſtence of the ſeveral objects which ſurround us, and operate upon our ſenſes. Teſtimony is of a wider extent, and reaches not only to objects beyond the preſent ſphere of our obſervation, but alſo to facts and tranſactions, which being now paſt, and having no longer any exiſtence, could not without this conveyance have fallen under our cognizance.

27 Three foundations of human judgement, viz. 1. Intuition, the ground of ſcientifical knowledge.

III. Here we have three foundations of human judgement, from which the whole ſyſtem of our knowledge may with eaſe and advantage be derived. Firſt, Intuition, which reſpects our ideas themſelves, and their relations; and is the foundation of that ſpecies of reaſoning which we call *demonſtration*. For whatever is deduced from our intuitive perceptions, by a clear and connected ſeries of proofs, is ſaid to be demonſtrated, and produces abſolute certainty in the mind. Hence the knowledge obtained in this manner is what we properly term *ſcience;* becauſe in every ſtep of the procedure it carries its own evidence along with it, and leaves no room for doubt or heſitation. And what is highly worthy of notice; as the truths of this claſs expreſs the relations between our ideas, and the ſame relations muſt ever and invariably ſubſiſt between the ſame ideas, our deductions in the way of ſcience conſtitute what we call *eternal*, *neceſſary*, and *immutable truths*. If it be true that the whole is equal to all its parts, it muſt be ſo unchangeably; becauſe the relation of equality being attached to the ideas themſelves, muſt ever intervene where the ſame ideas are compared. Of this nature all the truths of natural religion, morality, and mathematics, and in general whatever may be gathered from the bare view and conſideration of our ideas.

28 2. Experience, the ground of our knowledge of the powers and qualities of bodies.

IV. The ſecond ground of human judgement is *experience;* from which we infer the exiſtence of thoſe objects that ſurround us, and fall under the immediate notice of our ſenſes. When we ſeen the ſun, or caſt our eyes towards a building, we not only have perceptions of theſe objects within ourſelves, but aſcribe to them a real exiſtence out of the mind. It is alſo by the information of the ſenſes that we judge of the qualities of bodies; as when we ſay that *ſnow is white*, *fire hot*, or *ſteel hard*. For as we are wholly unacquainted with the internal ſtructure and conſtitution of the bodies that produce theſe ſenſations in us, nay, and are unable to trace any connexion between that ſtructure and the ſenſations themſelves, it is evident, that we build our judgements altogether upon obſervation, aſcribing to bodies ſuch qualities as are anſwerable to the perceptions they excite in us. Not that we ever ſuppoſe the qualities of bodies to be things of the ſame nature with our perceptions; for there is nothing in fire ſimilar to our ſenſation of heat, or in a ſword ſimilar to pain: but that when different bodies excite in our minds ſimilar perceptions, we neceſſarily aſcribe to theſe bodies not only an exiſtence independent of us, but likewiſe ſimilar qualities, of which it is the nature to produce ſimilar perceptions in the human mind. But this is not the only advantage derived from experience; for to that too we are indebted for all our knowledge regarding the co-exiſtence of ſenſible qualities in objects, and the operations of bodies one upon another. Ivory, for inſtance, is hard and elaſtic; this we know by experience, and indeed by that alone. For, being altogether ſtrangers to the true nature both of elaſticity and hardneſs, we cannot by the bare contemplation of our ideas determine how far the one neceſſarily implies the other, or whether there may not be a repugnance between them. But when we obſerve them to exiſt both in the ſame object, we are then aſſured from experience that they are not incompatible; and when we alſo find, that a ſtone is hard and not elaſtic, and that air though elaſtic is not hard, we alſo conclude upon the ſame foundation, that the ideas are not neceſſarily conjoined, but may exiſt ſeparately in different objects. In like manner, with regard to the operations of bodies one upon another, it is evident, that our knowledge this way is all derived from obſervation. *Aqua regia* diſſolves gold, as has been found by frequent trial, nor is there any other way of arriving at the diſcovery. Naturaliſts may tell us, if they pleaſe, that the parts of *aqua regia* are of a texture apt to inſinuate between the corpuſcles of gold, and thereby looſen and ſhake them aſunder. If this is a true account of the matter, it will notwithſtanding be allowed, that our conjecture in regard to the conformation of theſe bodies is deduced from the experiment, and not the experiment from the conjecture. It was not from any previous knowledge of the intimate ſtructure of *aqua regia* and *gold*, and the aptneſs of their parts to act or to be acted upon, that we came by the concluſion above mentioned. The internal conſtitution of bodies is in a manner wholly unknown to us: and could we even ſurmount this difficulty, yet as the ſeparation of the parts of gold implies ſomething like an active force in the *menſtruum*, and we are unable to conceive how it comes to be poſſeſſed of this activity, the effect muſt be owned to be altogether beyond our comprehenſion. But when repeated trials had once confirmed it, inſomuch that it was admitted as an eſtabliſhed truth in natural knowledge, it was then eaſy for men to ſpin out theories of their own invention, and contrive ſuch a ſtructure of parts, both for *gold* and *aqua regia*, as would beſt ſerve to explain the phenomenon upon the principles of that ſyſtem of philoſophy they had adopted.

V. From what has been ſaid it is evident, that as intuition is the foundation of what we call *ſcientifical* knowledge, ſo is experience of *natural*. For this laſt being wholly taken up with objects of ſenſe, or thoſe bodies that conſtitute the natural world; and their properties, as far as we can diſcover them, being to be traced only by a long and painful ſeries of obſervations; it is apparent, that, in order to improve this branch of knowledge, we muſt betake ourſelves to the method of trial and experiment.

VI. But though experience is what we may term the immediate foundation of natural knowledge, yet with reſpect to particular perſons its influence is very narrow and confined. The bodies that ſurround us are numerous, many of them lie at a great diſtance, and ſome quite beyond our reach. Life is ſo ſhort, and ſo crowded with cares, that but little time is left for any ſingle man to employ himſelf in unfolding the myſteries of nature. Hence it is neceſſary to admit many things upon the teſtimony of others, which by this means becomes the foundation of a great part of our knowledge of body. No man doubts of the power of *aqua regia* to diſſolve gold, though perhaps he never himſelf made the experiment. In theſe therefore and ſuch like caſes we judge of the facts and operations of nature upon the mere ground of teſtimony. However, as we can always have recourſe to experience where any doubt or ſcruple ariſes, this is juſtly conſidered as the true foundation of natural philoſophy; being indeed the ultimate ſupport upon which our aſſent reſts, and whereto we appeal when the higheſt degree of evidence is required.

[illegible] historical knowledge.

VII. But there are many facts that will not allow of an appeal to the ſenſes; and in this caſe teſtimony is the true and only foundation of our judgements. All human actions of whatever kind, when conſidered as already paſt, are of the nature here deſcribed; becauſe having now no longer any exiſtence, both the facts themſelves, and the circumſtances attending them, can be known only from the relations of ſuch as had ſufficient opportunities of arriving at the truth. *Teſtimony* therefore is juſtly accounted a third ground of human judgement; and as from the other two we have deduced *ſcientifical* and *natural* knowledge, ſo we may from this derive *hiſtorical;* by which we mean, not merely a knowledge of the civil tranſactions of ſtates and kingdoms, but of all facts whatſoever, where teſtimony is the ultimate foundation of our belief.

Chap. II. *Of Affirmative and Negative Propoſitions.*

30 The ſubject and predicate of a propoſition explained.

I. While the comparing of our ideas is conſidered merely as an act of the mind, aſſembling them together, and joining or disjoining them according to the reſult of its perceptions, we call it *judgement;* but when our judgements are put into words, they then bear the name of *propoſitions*. A propoſition therefore is a ſentence expreſſing ſome judgement of the mind, whereby two or more ideas are affirmed to agree or diſagree. Now, as our judgements include at leaſt two ideas, one of which is affirmed or denied of the other, ſo muſt a propoſition have terms anſwering to theſe ideas. The idea of which we affirm or deny, and of courſe the term expreſſing that idea, is called the *ſubject* of the propoſition. The idea affirmed or denied, as alſo the term anſwering it, is called the *predicate*. Thus in the propoſition, *God is omnipotent: God* is the ſubject, it being of him that we affirm omnipotence; and *omnipotent* is the predicate, becauſe we affirm the idea expreſſed by that word to belong to God.

31 The copula, &c.

II. But as, in propoſitions, ideas are either joined or disjoined; it is not enough to have terms expreſſing thoſe ideas, unleſs we have alſo ſome words to denote their agreement or diſagreement. That word in a propoſition, which connects two ideas together, is called the *copula;* and if a negative particle be annexed, we thereby underſtand that the ideas are disjoined. The *ſubſtantive verb* is commonly made uſe of for the copula: as in the above mentioned propoſition, *God is omnipotent;* where *is* repreſents the copula, and ſignifies the agreement of the ideas of *God* and *omnipotence*. But if we mean to ſeparate two ideas; then, beſides the ſubſtantive verb, we muſt alſo uſe ſome particle of negation, to expreſs this repugnance. The propoſition, *man is not perfect*, may ſerve as an example of this kind; where the notion of *perfection* being removed from the idea of *man*, the negative particle *not* is inſerted after the copula, to ſignify the diſagreement between the ſubject and predicate.

Propoſitions ſometimes ex- [illegible] word

III. Every propoſition neceſſarily conſiſts of theſe three parts; but then it is not alike needful that they be all ſeverally expreſſed in words; becauſe the copula is often included in the term of the predicate, as when we ſay, *he ſits*; which imports the ſame as *he is ſitting*. In the Latin language, a ſingle word has often the force of a whole ſentence. Thus *ambulat* is the ſame as *ille eſt ambulans*; *amo*, as *ego ſum amans*; and ſo in innumerable other inſtances: by which it appears, that we are not ſo much to regard the number of words in a ſentence, as the ideas they repreſent, and the manner in which they are put together. For wherever two ideas are joined or disjoined in an expreſſion, though of but a ſingle word; it is evident that we have a ſubject, predicate, and copula, and of conſequence a complete propoſition.

33 Affirmative and negative propoſition.

IV. When the mind joins two ideas, we call it an *affirmative* judgement; when it ſeparates them, *a negative*; and as any two ideas compared together muſt neceſſarily either agree or not agree, it is evident that all our judgements fall under theſe two diviſions. Hence likewiſe the propoſitions expreſſing theſe judgements are all either affirmative or negative. An affirmative propoſition connects the predicate with the ſubject, as *a ſtone is heavy*; a negative propoſition ſeparates them, as *God is not the author of evil*. *Affirmation* therefore is the ſame as joining two ideas together; and this is done by means of the copula. *Negation*, on the contrary, marks the repugnance between the ideas compared; in which caſe a negative particle muſt be called in, to ſhow that the connexion included in the copula does not take place.

34 When the negative particle ſerves to disjoin ideas.

V. Hence we ſee the reaſon of the rule commonly laid down by logicians, That in all negative propoſitions the negation ought to affect the copula. For as the copula, when placed by itſelf, between the ſubject and the predicate, manifeſtly binds them together; it is evident, that in order to render a propoſition negative, the particles of negation muſt enter it in ſuch a manner as to deſtroy this union. In a word, then only are two ideas disjoined in a propoſition, when the negative particle may be ſo referred to the copula, as to break the affirmation included in it, and undo that connexion it would otherwiſe eſtabliſh. When we ſay, for inſtance, *No man is perfect*; take away the negation, and the copula of itſelf plainly unites the ideas in the propoſition. But as this is the very reverſe of what is intended, a negative mark is added, to ſhow that this union does not here take place. The negation, therefore, by deſtroying the effect of the copula, changes the very nature of the propoſition, inſomuch that, inſtead of binding two ideas together, it denotes their ſeparation. On the contrary, in this ſentence, *The man who departs not from an upright behaviour is beloved of God*, the predicate *beloved of God* is evidently affirmed of the ſubject an *upright man*: ſo that, notwithſtanding the negative particle, the propoſition is ſtill affirmative. The reaſon is plain: the negation here affects not the copula; but, making properly a part of the ſubject, ſerves, with other terms in the ſentence, to form one complex idea, of which the predicate *beloved of God* is directly affirmed.

Chap. III. *Of Univerſal and Particular Propoſitions.*

35 Diviſion of propoſitions into univerſal and particular.

I. The next conſiderable diviſion of propoſitions is into *univerſal* and *particular*. Our ideas, according to what has been already obſerved in the Firſt Part, are all ſingular as they enter the mind, and repreſent individual objects. But as by abſtraction we can render them univerſal, ſo as to comprehend a whole claſs of things, and ſometimes ſeveral claſſes at once; hence the terms expreſſing theſe ideas muſt be in like manner univerſal. If therefore we ſuppoſe any general term to become the ſubject of a propoſition, it is evident, that whatever is affirmed of the abſtract idea belonging to that term, may be affirmed of all the individuals to which that idea extends. Thus, when we ſay, *Men are mortal*; we conſider mortality, not as confined to one or any number of particular men, but as what may be affirmed without reſtriction of the whole ſpecies. By this means the propoſition becomes as general as the idea which makes the ſubject of it; and indeed derives its univerſality entirely from that idea, being more or leſs ſo according as this may be extended to more or fewer individuals. But it is further to be obſerved of theſe general terms, that they ſometimes enter a propoſition in their full latitude, as in the example given above; and ſometimes appear with a mark of limitation. In this laſt caſe we are given to underſtand, that the predicate agrees not to the whole univerſal idea, but only to a part of it; as in the propoſition, *Some men are wiſe*: For here wiſdom is not affirmed of every particular man, but reſtrained to a few of the human ſpecies (B).

36 Propoſitions univerſal where the ſubject is ſo, without a mark of reſtriction.

II. Now from this different appearance of the general idea that conſtitutes the ſubject of any judgement, ariſes the diviſion of propoſitions into *univerſal* and *particular*. An univerſal propoſition is that wherein the ſubject is ſome general term taken in its full latitude; inſomuch that the predicate agrees to all the individuals comprehended under it, if it denotes a proper ſpecies; and to all the ſeveral ſpecies, and their individuals, if it marks an idea of a higher order. The words *all*, *every*, *no*, *none*, &c. are the proper ſigns of this univerſality; and as they ſeldom fail to accompany general truths, ſo they are the moſt obvious criterion whereby to diſtinguiſh them. *All animals have a power of beginning motion.* This is an univerſal propoſition; as we know from the word *all* prefixed to the ſubject *animals*, which denotes that it muſt be taken in its full extent. Hence the power of beginning motion may be affirmed of all the ſeveral ſpecies of animals.

37 Propoſitions particular where ſome univerſal ſubject appears with a mark of limitation.

III. A *particular* propoſition has in like manner ſome general term for its ſubject; but with a mark of limitation

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(B) See the preceding note, where it is demonſtrated that the *terms* alone, and not the *ideas*, are in reality *general*. The term *man* is equally applicable to every individual of the human race; and therefore, what is affirmed or denied of *men* in general, is affirmed or denied of all the individuals, without regard to their diſcriminating qualities. *Some* is a definitive word (ſee Grammar), which, prefixed to the word *man*, limits the ſignification of that *general term*; and therefore what is affirmed of *ſome men*, is affirmed only of *part* of the race, but that part itſelf is not aſcertained.

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limitation added, to denote, that the predicate agrees only to ſome of the individuals comprehended under a ſpecies, or to one or more of the ſpecies belonging to any genus, and not to the whole univerſal idea. Thus, *Some ſtones are heavier than iron; Some men have an uncommon ſhare of prudence.* In the laſt of theſe propoſitions, the ſubject *ſome men* implies only a certain number of individuals, comprehended under a ſingle ſpecies. In the former, where the ſubject is a genus that extends to a great variety of diſtinct claſſes, *ſome ſtones* may not only imply any number of particular ſtones, but alſo ſeveral whole ſpecies of ſtones, inaſmuch as there may be not a few with the property there deſcribed. Hence we ſee, that a propoſition does not ceaſe to be particular by the predicate's agreeing to a whole ſpecies, unleſs that ſpecies, ſingly and diſtinctly conſidered, makes alſo the ſubject of which we affirm or deny.

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IV. There is ſtill one ſpecies of propoſitions that remains to be deſcribed, and which the more deſerves our notice, as it is not yet agreed among logicians to which of the two claſſes mentioned above they ought to be referred; namely, *ſingular* propoſitions, or thoſe where the ſubject is an individual. Of this nature are the following: *Sir Iſaac Newton was the inventor of fluxions; This book contains many uſeful truths.* What occaſions ſome difficulty as to the proper rank of theſe propoſitions is, that, the ſubject being taken according to the whole of its extenſion, they ſometimes have the ſame effect in reaſoning as univerſals. But if it be conſidered that they are in truth the moſt limited kind of particular propoſitions, and that no propoſition can with any propriety be called univerſal but where the ſubject is ſome univerſal idea; we ſhall not be long in determining to which claſs they ought to be referred. When we ſay, *Some books contain uſeful truths;* the propoſition is particular, becauſe the general term appears with a mark of reſtriction. If therefore we ſay, *This book contains uſeful truths;* it is evident that the propoſition muſt be ſtill more particular, as the limitation implied in the word *this*, is of a more confined nature than in the former caſe.

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V. We ſee, therefore, that all propoſitions are either *affirmative* or *negative;* nor is it leſs evident, that in both caſes they may be *univerſal* or *particular*. Hence ariſes that celebrated fourfold diviſion of them into *univerſal affirmative* and *univerſal negative*, *particular affirmative* and *particular negative*, which comprehends indeed all their varieties. The uſe of this method of diſtinguiſhing them will appear more fully afterwards, when we come to treat of reaſoning and ſyllogiſm.

Chap. IV. *Of Abſolute and Conditional Propoſitions.*

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I. The objects about which we are chiefly converſant in this world, are all of a nature liable to change. What may be affirmed of them at one time, cannot often at another; and it makes no ſmall part of our knowledge to diſtinguiſh rightly theſe variations, and trace the reaſons upon which they depend. For it is obſervable, that amidſt all the viciſſitudes of nature, ſome things remain conſtant and invariable; nor even are the changes, to which we ſee others liable, effected but in conſequence of uniform and ſteady laws, which, when known, are ſufficient to direct us in our judgements about them. Hence philoſophers, in diſtinguiſhing the objects of our perception into various claſſes, have been very careful to note, that ſome properties belong eſſentially to the general idea, ſo as not to be ſeparable from it but by deſtroying its very nature; while others are only accidental, and may be affirmed or denied of it in different circumſtances. Thus ſolidity, a yellow colour, and great weight, are conſidered as eſſential qualities of gold: but whether it ſhall exiſt as an uniform conjoined maſs, is not alike neceſſary. We ſee that by a proper menſtruum it may be reduced to a fine powder, and that an intenſe heat will bring it into a ſtate of fuſion.

41
Hence a conſiderable diverſity in our manner of judging.

II. From this diverſity in the ſeveral qualities of things ariſes a conſiderable difference as to the manner of our judging about them. For all ſuch properties as are inſeparable from objects when conſidered as belonging to any genus or ſpecies, are affirmed abſolutely and without reſerve of that general idea. Thus we ſay, *Gold is very weighty; A ſtone is hard; Animals have a power of ſelf-motion.* But in the caſe of mutual or accidental qualities, as they depend upon ſome other conſideration diſtinct from the general idea; that alſo muſt be taken into the account, in order to form an accurate judgement. Should we affirm, for inſtance, of ſome ſtones, that they are very ſuſceptible of a rolling motion; the propoſition, while it remains in this general form, cannot with any advantage be introduced into our reaſonings. An aptneſs to receive that mode of motion flows from the figure of the ſtone; which, as it may vary infinitely, our judgement then only becomes applicable and determinate, when the particular figure, of which volubility is a conſequence, is alſo taken into the account. Let us then bring in this other conſideration, and the propoſition will run as follows: *Stones of a ſpherical form are eaſily put into a rolling motion.* Here we ſee the condition upon which the predicate is affirmed, and therefore know in what particular caſes the propoſition may be applied.

42
Which gives riſe to the diviſion of propoſitions into abſolute and conditional.

III. This conſideration of propoſitions reſpecting the manner in which the predicate is affirmed of the ſubject gives riſe to the diviſion of them into *abſolute* and *conditional.* *Abſolute* propoſitions are thoſe wherein we affirm ſome property inſeparable from the idea of the ſubject, and which therefore belongs to it in all poſſible caſes: as, *God is infinitely wiſe; Virtue tends to the ultimate happineſs of man.* But where the predicate is not neceſſarily connected with the idea of the ſubject, unleſs upon ſome conſideration diſtinct from that idea, there the propoſition is called *conditional.* The reaſon of the name is taken from the ſuppoſition annexed, which is of the nature of a condition, and may be expreſſed as ſuch, thus: *If a ſtone is expoſed to the rays of the ſun, it will contract ſome degree of heat; If a river runs in a very declining channel, its rapidity will conſtantly increaſe.*

43
The great importance of this diviſion, as it [illegible]

IV. There is not any thing of greater importance in philoſophy than a due attention to this diviſion of propoſitions. If we are careful never to affirm things abſolutely but where the ideas are inſeparably conjoined; and if in our other judgements we diſtinctly mark the conditions which determine the predicate to belong to the ſubject; we ſhall be the leſs liable to miſtake in applying general truths to the particular concerns of human life. It is owing to the exact obſervance of this rule that mathematicians have been ſo happy in their diſcoveries, and that what they demonſtrate of magnitude in general may be applied with eaſe in all obvious occurrences.

44
And reduces them from particulars to generals.

V. The truth of it is, particular propoſitions are then known to be true, when we can trace their connexion with univerſals; and it is accordingly the great buſineſs of ſcience to find out general truths that may be applied with ſafety in all obvious inſtances. Now the great advantage ariſing from determining with care the conditions upon which one idea may be affirmed or denied of another is this: that thereby particular propoſitions really become univerſal, may be introduced with certainty into our reaſonings, and ſerve as ſtandards to conduct and regulate our judgements. To illuſtrate this by a familiar inſtance: if we ſay, *Some water acts very forcibly;* the propoſition is particular: and as the conditions on which this forcible action depends are not mentioned, it is as yet uncertain in what caſes it may be applied. Let us then ſupply theſe conditions, and the propoſition will run thus: *Water conveyed in ſufficient quantity along a ſteep deſcent acts very forcibly.* Here we have an univerſal judgement, inaſmuch as the predicate *forcible action* may be aſcribed to all water under the circumſtances mentioned. Nor is it leſs evident that the propoſition in this new form is of eaſy application; and in fact we find that men do apply it in inſtances where the forcible action of water is required; as in corn-mills and many other works of art.

CHAP. V. *Of Simple and Compound Propoſitions.*

45
Diviſion of propoſitions into ſimple and compound.

I. HITHERTO we have treated of propoſitions, where only two ideas are compared together. Theſe are in the general called *ſimple;* becauſe, having but one ſubject and one predicate, they are the effect of a ſimple judgement that admits of no ſubdiviſion. But if it ſo happens that ſeveral ideas offer themſelves to our thoughts at once, whereby we are led to affirm the ſame thing of different objects, or different things of the ſame object; the propoſitions expreſſing theſe judgements are called *compound:* becauſe they may be reſolved into as many others as there are ſubjects or predicates in the whole complex determination on the mind. Thus, *God is infinitely wiſe and infinitely powerful.* Here there are two predicates, *infinite wiſdom and infinite power*, both affirmed of the ſame ſubject; and accordingly the propoſition may be reſolved into two others; affirming theſe predicates ſeverally. In like manner in the propoſition, *Neither kings nor people are exempt from death;* the predicate is denied of both ſubjects, and may therefore be ſeparated from them in diſtinct propoſitions. Nor is it leſs evident, that if a complex judgement conſiſts of ſeveral ſubjects and predicates, it may be reſolved into as many ſimple propoſitions as are the number of different ideas compared together. *Riches and honours are apt to elate the mind, and increaſe the number of our deſires.* In this judgement there are two ſubjects and two predicates, and it is at the ſame time apparent that it may be reſolved into four diſtinct propoſitions. *Riches are apt to elate the mind. Riches are apt to increaſe the number of our deſires.* And ſo of honours.

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II. Logicians have divided theſe compound propoſitions into a great many different claſſes; but, in our opinion, not with a due regard to their proper definition. Thus *conditionals*, *cauſals*, *relatives*, &c. are mentioned as ſo many diſtinct ſpecies of this kind, though in fact they are no more than ſimple propoſitions. To give an inſtance of a conditional; *If a ſtone is expoſed to the rays of the ſun, it will contract ſome degree of heat.* Here we have but one ſubject and one predicate; for the complex expreſſion, *A ſtone expoſed to the rays of the ſun*, conſtitutes the proper ſubject of this propoſition, and is no more than one determined idea. The ſame thing happens in cauſals. *Rehoboam was unhappy becauſe he followed evil counſel.* There is here an appearance of two propoſitions ariſing from the complexity of the expreſſion; but when we come to conſider the matter more nearly, it is evident that we have but a ſingle ſubject and predicate. *The purſuit of evil counſel brought miſery upon Rehoboam.* It is not enough, therefore, to render a propoſition compound, that the ſubject and predicate are complex notions, requiring ſometimes a whole ſentence to expreſs them: for in this caſe the compariſon is ſtill confined to two ideas, and conſtitutes what we call a ſimple judgement. But where there are ſeveral ſubjects or predicates, or both, as the affirmation or negation may be alike extended to them all, the propoſition expreſſing ſuch a judgement is truly a collection of as many ſimple ones as there are different ideas compared. Confining ourſelves therefore to this more ſtrict and juſt notion of compound propoſitions, they are all reducible to two kinds, viz. *copulatives* and *disjunctives*.

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III. A *copulative* propoſition is, where the ſubjects and predicates are ſo linked together, that they may be all ſeverally affirmed or denied one of another. Of this nature are the examples of compound propoſitions given above. *Riches and honours are apt to elate the mind, and increaſe the number of our deſires. Neither kings nor people are exempt from death.* In the firſt of theſe the two predicates may be affirmed ſeverally of each ſubject, whence we have four diſtinct propoſitions. The other furniſhes an example of the negative kind, where the ſame predicate, being disjoined from both ſubjects, may be alſo denied of them in ſeparate propoſitions.

48
or disjun
tive.

IV. The other ſpecies of compound propoſitions are thoſe called disjunctives; in which, comparing ſeveral predicates with the ſame ſubject, we affirm that one of them neceſſarily belongs to it, but leave the particular predicate undetermined. If any one, for example, ſays, *This world either exiſts of itſelf, or is the work of ſome all-wiſe and powerful cauſe*, it is evident that one of the two predicates muſt belong to the world; but as the propoſition determines not which, it is therefore of the kind we call *disjunctive.* Such too are the following: *The ſun either moves round the earth, or is the centre about which the earth revolves. Friendſhip finds men equal, or makes them ſo.* It is the nature of all propoſitions of this claſs, ſuppoſing them to be exact in point of form, that upon determining the particular predicate, the reſt are of courſe to be removed: or if all the predicates but one are removed, that one neceſſarily takes place. Thus, in the example given above; if we allow the world to be the work of ſome wiſe and powerful cauſe, we of courſe deny it to be ſelf-exiſtent; or if we deny it to be ſelf-exiſtent, we muſt neceſſarily admit that it was produced by ſome wiſe and powerful cauſe. Now this particular manner of linking the predicates together, ſo that the eſtabliſhing one diſplaces all the reſt; or the excluding all but one neceſſarily eſtabliſhes that one; cannot otherwiſe be effected than by means of *disjunctive* particles. And hence it is that propoſitions of this claſs take their names from theſe particles which make ſo neceſſary a part of them, and indeed conſtitute their very nature conſidered as a diſtinct ſpecies.

CHAP. VI. *Of the Diviſion of Propoſitions into Self-evident and Demonſtrable.*

49 opoſiti- divided o ſelf- dent and monſtra-

I. WHEN any propoſition is offered to the view of the mind, if the terms in which it is expreſſed be underſtood; upon comparing the ideas together, the agreement or diſagreement aſſerted is either immediately perceived, or found to lie beyond the preſent reach of the underſtanding. In the firſt caſe the propoſition is ſaid to be *ſelf-evident*, and admits not of any proof, becauſe a bare attention to the ideas themſelves produces full conviction and certainty; nor is it poſſible to call in any thing more evident by way of confirmation. But where the connexion or repugnance comes not ſo readily under the inſpection of the mind, there we muſt have recourſe to reaſoning; and if by a clear ſeries of proofs we can make out the truth propoſed, inſomuch that ſelf-evidence ſhall accompany every ſtep of the procedure, we are then able to demonſtrate what we aſſert, and the propoſition itſelf is ſaid to be *demonſtrable*. When we affirm, for inſtance, *that it is impoſſible for the ſame thing to be and not to be;* whoever underſtands the terms made uſe of perceives at firſt glance the truth of what is aſſerted, nor can he by any efforts bring himſelf to believe the contrary. The propoſition therefore is *ſelf-evident*, and ſuch that it is impoſſible by reaſoning to make it plainer; becauſe there is no truth more obvious or better known, from which as a conſequence it may be deduced. But if we ſay, *This world had a beginning;* the aſſertion is indeed equally true, but ſhines not forth with the ſame degree of evidence. We find great difficulty in conceiving how the world could be made out of nothing: and are not brought to a free and full conſent, until by reaſoning we arrive at a clear view of the abſurdity involved in the contrary ſuppoſition. Hence this propoſition is of the kind we call *demonſtrable*, inaſmuch as its truth is not immediately perceived by the mind, but yet may be made appear by means of others more known and obvious, whence it follows as an unavoidable conſequence.

50 f-evi- t truths firſt nciples eaſon-

II. From what has been ſaid, it appears, that reaſoning is employed only about demonſtrable propoſitions, and that our intuitive and ſelf-evident perceptions are the ultimate foundation on which it reſts.

III. Self-evident propoſitions furniſh the firſt principles of reaſoning; and it is certain, that if in our reſearches we employ only ſuch principles as have this character of ſelf-evidence, and apply them according to the rules to be afterwards explained, we ſhall be in no danger of error in advancing from one diſcovery to another. For this we may appeal to the writings of the mathematicians, which, being conducted by the expreſs model here mentioned, are an inconteſtable proof of the firmneſs and ſtability of human knowledge, when built upon ſo ſure a foundation. For not only have the propoſitions of this ſcience ſtood the teſt of ages; but are found attended with that invincible evidence, as forces the aſſent of all who duly conſider the proofs upon which they are eſtabliſhed. Since the mathematicians are univerſally allowed to have hit upon the right method of arriving at unknown truths, ſince they have been the happieſt in the choice as well as the application of their principles, it may not be amiſs to explain here their method of ſtating ſelf-evident propoſitions, and applying them to the purpoſes of demonſtration.

51 Definitions a great help to clearneſs and evidence in knowledge.

IV. Firſt then it is to be obſerved, that they have been very careful in aſcertaining their ideas, and fixing the ſignification of their terms. For this purpoſe they begin with *definitions*, in which the meaning of their words is ſo diſtinctly explained, that they cannot fail to excite in the mind of an attentive reader the very ſame ideas as are annexed to them by the writer. And indeed the clearneſs and irreſiſtible evidence of mathematical knowledge is owing to nothing ſo much as this care in laying the foundation. Where the relation between any two ideas is accurately and juſtly traced, it will not be difficult for another to comprehend that relation, if in ſetting himſelf to diſcover it he brings the very ſame ideas into compariſon. But if, on the contrary, he affixes to his words ideas different from thoſe that were in the mind of him who firſt advanced the demonſtration; it is evident that as the ſame ideas are not compared, the ſame relation cannot ſubſiſt, inſomuch that a propoſition will be rejected as falſe, which, had the terms been rightly underſtood, muſt have appeared inconteſtably true. A ſquare, for inſtance, is a figure bounded by four equal right lines, joined together at right angles. Here the nature of the angles makes no leſs a part of the idea than the equality of the ſides: and many properties demonſtrated of the ſquare flow entirely from its being a rectangular figure. If therefore we ſuppoſe a man, who has formed a partial notion of a ſquare, comprehending only the equality of its ſides, without regard to the angles, reading ſome demonſtration that implies alſo this latter conſideration; it is plain he would reject it as not univerſally true, inaſmuch as it could not be applied where the ſides were joined together at equal angles. For this laſt figure, anſwering ſtill to his idea of a ſquare, would be yet found without the property aſſigned to it in the propoſition. But if he comes afterwards to correct his notion, and render his idea complete, he will then readily own the truth and juſtneſs of the demonſtration.

52 Mathematicians, by beginning with them procure a ready reception to the truths they advance

V. We ſee, therefore, that nothing contributes ſo much to the improvement and certainty of human knowledge, as the having determinate ideas, and keeping them ſteady and invariable in all our diſcourſes and reaſonings about them. And on this account it is, that mathematicians, as was before obſerved, always

Of Judgement.

always begin by defining their terms, and diſtinctly unfolding the notions they are intended to expreſs. Hence ſuch as apply themſelves to theſe ſtudies have exactly the ſame views of things: and, bringing always the very ſame ideas into compariſon, readily diſcern the relations between them. It is likewiſe of importance, in every demonſtration, to expreſs the ſame *idea* invariably by the ſame word. From this practice mathematicians never deviate; and if it be neceſſary in their demonſtrations, where the reader's comprehenſion is *aided* by a diagram, it is much more ſo in all reaſonings about moral or intellectual truths where the ideas cannot be repreſented by a diagram. The obſervation of this rule may ſometimes be productive of ill-ſounding periods; but when *truth* is the object, *ſound* ought to be deſpiſed.

53
The eſtabliſhing of principles, the ſecond ſtep in mathematical knowledge.

VI. When the mathematicians have taken this firſt ſtep, and made known the ideas whoſe relations they intend to inveſtigate; their next care is, to lay down ſome ſelf-evident truths, which may ſerve as a foundation for their future reaſonings. And here indeed they proceed with remarkable circumſpection, admitting no principles but what flow immediately from their definitions, and neceſſarily force themſelves upon a mind in any degree attentive to its ideas. Thus a *circle* is a figure formed by a right line moving round ſome fixed point in the ſame plane. The fixed point round which the line is ſuppoſed to move, and where one of its extremities terminates, is called the *centre* of the circle. The other extremity, which is conceived to be carried round until it returns to the point whence it firſt ſet out, deſcribes a curve running into itſelf, and termed the *circumference*. All right lines drawn from the centre to the circumference are called *radii*. From theſe definitions compared, geometricians derive this ſelf-evident truth; *that the radii of the ſame circle are all equal to one another*.

54
Propoſitions divided into ſpeculative and practical.

VII. We now obſerve, that in all propoſitions we either affirm or deny ſome property of the idea that conſtitutes the ſubject of our judgement, or we maintain that ſomething may be done or effected. The firſt ſort are called *ſpeculative* propoſitions, as in the example mentioned above, the *radii of the ſame circle are all equal one to another*. The others are called *practical*, for a reaſon too obvious to be mentioned; thus, *that a right line may be drawn from one point to another* is a practical propoſition; inaſmuch as it expreſſed that ſomething may be done.

55
Hence mathematical principles diſtinguiſhed into axioms and poſtulates;

VIII. From this twofold conſideration of propoſitions ariſes the twofold diviſion of mathematical principles into axioms and poſtulates. By an *axiom* they underſtand any ſelf-evident ſpeculative truth; as, *That the whole is greater than its parts: That things equal to one and the ſame thing are equal to one another*. But a ſelf-evident practical propoſition is what they call a *poſtulate*. Such are thoſe of Euclid; *that a finite right line may be continued directly forwards; that a circle may be deſcribed about any centre with any diſtance*. And here we are to obſerve, that as in an axiom the agreement or diſagreement between the ſubject and predicate muſt come under the immediate inſpection of the mind; ſo in a poſtulate, not only the poſſibility of the thing aſſerted muſt be evident at firſt view, but alſo the manner in which it may be effected. For where this manner is not of itſelf apparent, the propoſition comes under the notion of the demonſtrable kind and is treated as ſuch by geometrical writers. Thus, *to draw a right line from one point to another*, is aſſumed by Euclid as a poſtulate, becauſe the manner of doing it is ſo obvious, as to require no previous teaching. But then it is not equally evident, how we are to conſtruct an equilateral triangle. For this reaſon he advances it as a demonſtrable propoſition, lays down rules for the exact performance, and at the ſame time proves, that if theſe rules are followed, the figure will be juſtly deſcribed.

56
and dem ſtrable p poſitions to theore and pro.

IX This leads us to take notice, that as ſelf-evident truths are diſtinguiſhed into different kinds, according as they are ſpeculative or practical; ſo is it alſo with demonſtrable propoſitions. A demonſtrable ſpeculative propoſition is by mathematicians called a *theorem*. Such is the famous 47th propoſition of the firſt book of the Elements, known by the name of the *Pythagoric theorem*, from its ſuppoſed inventor Pythagoras, viz. "that in every right-angled triangle, the ſquare deſcribed upon the ſide ſubtending the right angle is equal to both the ſquares deſcribed upon the ſides containing the right angle." On the other hand, a demonſtrable practical propoſition is called a *problem*; as where Euclid teaches us to deſcribe a ſquare upon a given right line.

57
Corollari are obvic deductio from the rems or p blems.

X. It may not be amiſs to add, that, beſides the four kinds of propoſitions already mentioned, mathematicians have alſo a fifth, known by the name of *corollaries*. Theſe are uſually ſubjoined to theorems or problems, and differ from them only in this: that they flow from what is there demonſtrated in ſo obvious a manner as to diſcover their dependence upon the propoſition whence they are deduced, almoſt as ſoon as propoſed. Thus Euclid having demonſtrated, "that in every right-lined triangle all the three angles taken together are equal to two right angles;" adds by way of corollary, "that all the three angles of any one triangle taken together are equal to all the three angles of any other triangle taken together: which is evident at firſt ſight; becauſe in all caſes they are equal to two right ones, and things equal to one and the ſame thing are equal to one another.

58
Scholia ſerve th purpoſe annotati or a com ment.

XI. The ſcholia of mathematicians are indifferently annexed to definitions, propoſitions, or corollaries; and anſwer the ſame purpoſes as annotations upon a claſſic author. For in them occaſion is taken to explain whatever may appear intricate and obſcure in a train of reaſoning; to anſwer objections; to teach the application and uſes of propoſitions; to lay open the original and hiſtory of the ſeveral diſcoveries made in the ſcience; and, in a word, to acquaint us with all ſuch particulars as deſerve to be known, whether conſidered as points of curioſity or profit.

PART III. OF REASONING.

CHAP. I. *Of Reaſoning in general, and the Parts of which it conſiſts.*

IT often happens in comparing ideas together, that their agreement or diſagreement cannot be diſcerned at firſt view, eſpecially if they are of ſuch a nature as not to admit of an exact application one to another.

59 Remote relations diſcovered by means of intermediate ideas. When, for inſtance, we compare two figures of a different make, in order to judge of their equality or inequality, it is plain, that by barely conſidering the figures themſelves, we cannot arrive at an exact determination; becauſe, by reaſon of their diſagreeing forms, it is impoſſible ſo to put them together, as that their ſeveral parts ſhall mutually coincide. Here then it becomes neceſſary to look out for ſome third idea that will admit of ſuch an application as the preſent caſe requires; wherein if we ſucceed, all difficulties vaniſh, and the relation we are in queſt of may be traced with eaſe. Thus, right-lined figures are all reduced to ſquares, by means of which we can meaſure their areas, and determine exactly their agreement or diſagreement in point of magnitude.

60 This manner of arriving at truth termed reaſoning. II. But how can any third idea ſerve to diſcover a relation between two others? The anſwer is, By being compared ſeverally with theſe others; for ſuch a compariſon enables us to ſee how far the ideas with which this third is compared are connected or disjoined between themſelves. In the example mentioned above of two right-lined figures, if we compare each of them with ſome ſquare whoſe area is known, and find the one exactly equal to it, and the other leſs by a ſquare inch, we immediately conclude that the area of the firſt figure is a ſquare inch greater than that of the ſecond. This manner of determining the relation between any two ideas, by the intervention of ſome third with which they may be compared, is that which we call *reaſoning;* and is indeed the chief inſtrument by which we puſh on our diſcoveries, and enlarge our knowledge. The great art lies in finding out ſuch intermediate ideas, as when compared with the others in the queſtion, will furniſh evident and known truths; becauſe, as will afterwards appear, it is only by means of them that we arrive at the knowledge of what is hidden and remote.

61 The parts that conſtitute an act of reaſoning and a ſyllogiſm. III. Hence it appears, that every act of reaſoning neceſſarily includes three diſtinct judgements; two wherein the ideas whoſe relation we want to diſcover are ſeverally compared with the middle idea, and a third wherein they are themſelves connected or disjoined, according to the reſult of that compariſon. Now, as in the ſecond part of logic, our judgements, when put into words, were called propoſitions, ſo here in the third part the expreſſions of our reaſonings are termed *ſyllogiſms*. And hence it follows, that as every act of reaſoning implies three ſeveral judgements, ſo every ſyllogiſm muſt include three diſtinct propoſitions. When a reaſoning is thus put into words, and appears in form of a ſyllogiſm, the intermediate idea made uſe of, to diſcover the agreement or diſagreement we ſearch for, is called the *middle term;* and the two ideas themſelves with which this third is compared, go by the name of the *extremes*.

62 [illegible] VI. But as theſe things are beſt illuſtrated by examples; let us, for inſtance, ſet ourſelves to inquire *whether men are accountable for their actions.* As the relation between the ideas of *man* and *accountableneſs*, comes not within the immediate view of the mind, our firſt care muſt be to find out ſome third idea that will enable us the more eaſily to diſcover and trace it. A very ſmall meaſure of reflection is ſufficient to inform us, that no creature can be accountable for his actions, unleſs we ſuppoſe him capable of diſtinguiſhing the good from the bad; that is, unleſs we ſuppoſe him poſſeſſed of reaſon. Nor is this alone ſufficient. For what would it avail him to know good from bad actions, if he had no freedom of choice, nor could avoid the one and purſue the other? hence it becomes neceſſary to take in both conſiderations in the preſent caſe. It is at the ſame time equally apparent, that wherever there is ability of diſtinguiſhing good from bad actions, and of purſuing the one and avoiding the other, there alſo a creature is accountable. We have then got a third idea, with which *accountableneſs* is inſeparably connected, viz. *reaſon and liberty;* which are here to be conſidered as making up one complex conception. Let us now take this middle idea, and compare it with the other term in the queſtion, viz. *man*, and we all know by experience that it may be affirmed of him. Having thus by means of the intermediate idea formed two ſeveral judgements, viz. *that man is poſſeſſed of reaſon and liberty;* and *that reaſon and liberty imply accountableneſs;* a third obviouſly and neceſſarily follows, viz. *that man is accountable for his actions.* Here then we have a complete act of reaſoning, in which, according to what has been already obſerved, there are three diſtinct judgements: two that may be ſtyled previous, inaſmuch as they lead to the other, and ariſe from comparing the middle idea with the two ideas in the queſtion: the third is a conſequence of theſe previous acts, and flows from combining the extreme ideas between themſelves. If now we put this reaſoning into words, it exhibits what logicians term a ſyllogiſm; and, when propoſed in due form, runs thus:

> " Every creature poſſeſſed of reaſon and liberty is
> " accountable for his actions.
> " Man is a creature poſſeſſed of reaſon and liberty:
> " Therefore man is accountable for his actions."

63 Premiſes, concluſion, extremes, middle term. V. In this ſyllogiſm we may obſerve, that there are three ſeveral propoſitions expreſſing the three judgements implied in the act of reaſoning; and ſo diſpoſed, as to repreſent diſtinctly what paſſes within the mind in tracing the more diſtant relations of its ideas. The two firſt propoſitions anſwer the two previous judgements in reaſoning, and are called the *premiſes*, becauſe they are placed before the other. The third is termed the *concluſion*, as being gained in conſequence of what was aſſerted in the premiſes. We are alſo to remember,

that the terms expreſſing the two ideas whoſe relations we inquire after, as here *man* and *accountableneſs*, are in general called the *extremes*; and that the intermediate idea, by means of which the relation is traced, viz. *a creature poſſeſſed of reaſon and liberty*, takes the name of the *middle term*. Hence it follows, that by the *premiſes* of a ſyllogiſm we are always to underſtand the two propoſitions where the middle term is ſeverally compared with the *extremes*; for theſe conſtitute the previous judgements, whence the truth we are in queſt of is by reaſoning deduced. The *concluſion* is that other propoſition, in which the *extremes* themſelves are joined or ſeparated agreeably to what appears upon the above compariſon.

64 Major and minor term, major and minor propoſition.

VI. The concluſion is made up of the extreme terms of the ſyllogiſm: and the extreme, which ſerves as the predicate of the concluſion, goes by the name of the *major term*: the other extreme, which makes the ſubject in the ſame propoſition, is called the *minor term*. From this diſtinction of the extremes ariſes alſo a diſtinction between the premiſes, where theſe extremes are ſeverally compared with the middle term. That propoſition which compares the greater extreme, or the predicate of the concluſion, with the middle term, is called the *major propoſition*: the other, wherein the ſame middle term is compared with the ſubject of the concluſion or leſſer extreme, is called the *minor propoſition*. All this is obvious from the ſyllogiſm already given, where the concluſion is, *Man is accountable for his actions*. For here the predicate *accountable for his actions* being connected with the middle term in the firſt of the two premiſes, *every creature poſſeſſed of reaſon and liberty is accountable for his actions*, gives what we call the *major propoſition*. In the ſecond of the premiſes, *man is a creature poſſeſſed of reaſon and liberty*, we find the leſſer extreme, or ſubject of the concluſion, viz. *man*, connected with the ſame middle term, whence it is known to be the *minor propoſition*. When a ſyllogiſm is propoſed in due form, the major propoſition is always placed firſt, the minor next, and the concluſion laſt.

65 In a ſingle act of reaſoning the premiſes muſt be intuitive truths.

VII. Theſe things premiſed, we may in the general define reaſoning to be an act or operation of the mind, deducing ſome unknown propoſition from other previous ones that are evident and known. Theſe previous propoſitions, in a ſimple act of reaſoning, are only two in number; and it is always required that they be of themſelves apparent to the underſtanding, inſomuch that we aſſent to and perceive the truth of them as ſoon as propoſed. In the ſyllogiſm given above, the premiſes are ſuppoſed to be ſelf-evident truths; otherwiſe the concluſion could not be inferred by a ſingle act of reaſoning. If, for inſtance, in the major, *every creature poſſeſſed of reaſon and liberty is accountable for his actions*, the connexion between the ſubject and predicate could not be perceived by a bare attention to the ideas themſelves; it is evident that this propoſition would no leſs require a proof than the concluſion deduced from it. In this caſe a new middle term muſt be ſought for, to trace the connexion here ſuppoſed; and this of courſe furniſhes another ſyllogiſm, by which having eſtabliſhed the propoſition in queſtion, we are then, and not before, at liberty to uſe it in any ſucceeding train of reaſoning. And ſhould it ſo happen, that in this ſecond eſſay there was ſtill ſome previous propoſition whoſe truth did not appear at firſt ſight, we muſt then have recourſe to a third ſyllogiſm, in order to lay open that truth to the mind: becauſe ſo long as the premiſes remain uncertain, the concluſion built upon them muſt be ſo too. When, by conducting our thoughts in this manner, we at laſt arrive at ſome ſyllogiſm where the previous propoſitions are intuitive truths; the mind then reſts in full ſecurity, as perceiving that the ſeveral concluſions it has paſſed through ſtand upon the immoveable foundation of ſelf-evidence, and when traced to their ſource terminate in it.

66 Reaſoning, in the higheſt exerciſe of it, only a concatenation of ſyllogiſms.

VIII. We ſee, therefore, that in order to infer a concluſion by a ſingle act of reaſoning, the premiſes muſt be intuitive propoſitions. Where they are not, previous ſyllogiſms are required; in which caſe reaſoning becomes a complicated act, taking in a variety of ſucceſſive ſteps. This frequently happens in tracing the more remote relation of our ideas; where, many middle terms being called in, the concluſion cannot be made out but in conſequence of a ſeries of ſyllogiſms following one another in train. But although in this concatenation of propoſitions, thoſe that form the premiſes of the laſt ſyllogiſm are often conſiderably removed from ſelf-evidence; yet if we trace the reaſoning backwards, we ſhall find them the concluſions of previous ſyllogiſms, whoſe premiſes approach nearer and nearer to intuition in proportion as we advance, and are found at laſt to terminate in it. And if, after having thus unravelled a demonſtration, we take it the contrary way; and obſerve how the mind, ſetting out with intuitive perceptions, couples them together to form a concluſion: how, by introducing this concluſion into another ſyllogiſm, it ſtill advances one ſtep farther; and ſo proceeds, making every new diſcovery ſubſervient to its future progreſs; we ſhall then perceive clearly, that reaſoning, in the higheſt ſenſe of that faculty, is no more than an orderly combination of thoſe ſimple acts which we have already ſo fully explained.

67 Requires intuitive certainty in every ſtep of the progreſſion.

IX. Thus we ſee, that reaſoning, beginning with firſt principles, riſes gradually from one judgement to another, and connects them in ſuch manner, that every ſtage of the progreſſion brings intuitive certainty along with it. And now at length we may clearly underſtand the definition given above of this diſtinguiſhing faculty of the human mind. Reaſon, we have ſaid, is the ability of deducing unknown truths from principles or propoſitions that are already known. This evidently appears by the foregoing account, where we ſee that no propoſition is admitted into a ſyllogiſm, to ſerve as one of the previous judgements on which the concluſion reſts, unleſs it is itſelf a known and eſtabliſhed truth, whoſe connexion with ſelf-evident principles has been already traced.

Chap. II. *Of the ſeveral kinds of Reaſoning: and firſt, of that by which we determine the Genera and Species of Things.*

68 Reaſoning twofold.

I. All the aims of human reaſon may in the general be reduced to theſe two: 1. To rank things under thoſe univerſal ideas to which they truly belong; and, 2. To aſcribe to them their ſeveral attributes and properties in conſequence of that diſtribution.

II. One

69 The firſt kind regards the genera and ſpecies of things.

* See *Foot note*, p. 136.

II. One great aim of human reaſon is to determine the genera and ſpecies of things. We have ſeen in the Firſt Part of this treatiſe, how the mind proceeds in framing general ideas *. We have alſo ſeen in the Second Part, how by means of theſe general ideas we come by univerſal propoſitions. Now as in theſe univerſal propoſitions we affirm ſome property of a genus or ſpecies, it is plain that we cannot apply this property to particular objects till we have firſt determined whether they are comprehended under that general idea of which the property is affirmed. Thus there are certain properties belonging to all *even* numbers, which nevertheleſs cannot be applied to any particular number, until we have firſt diſcovered it to be of the ſpecies expreſſed by that natural name. Hence reaſoning begins with referring things to their ſeveral diviſions and claſſes in the ſcale of our ideas; and as theſe diviſions are all diſtinguiſhed by particular names, we hereby learn to apply the terms expreſſing general conceptions to ſuch particular objects as come under our immediate obſervation.

70 The ſteps by which we arrive at concluſions of this ſort.

III. Now, in order to arrive at theſe concluſions, by which the ſeveral objects of perception are brought under general names, two things are manifeſtly neceſſary. Firſt, That we take a view of the idea itſelf denoted by that general name, and carefully attend to the diſtinguiſhing marks which ſerve to characterize it. Secondly, That we compare this idea with the object under conſideration, obſerving diligently wherein they agree or differ. If the idea is found to correſpond with the particular object, we then without heſitation apply the general name; but if no ſuch correſpondence intervenes, the concluſion muſt neceſſarily take a contrary turn. Let us, for inſtance, take the number *eight*, and conſider by what ſteps we are led to pronounce it an *even* number. Firſt then, we call to mind the idea ſignified by the expreſſion *an even number*, viz. that it is a number diviſible into two equal parts. We then compare this idea with the number *eight*, and finding them manifeſtly to agree, ſee at once the neceſſity of admitting the concluſion. Theſe ſeveral judgements therefore transferred into language, and reduced to the form of a ſyllogiſm, appear thus:

> " Every number that may be divided into two equal
> " parts is an *even* number:
> " The number eight may be divided into two equal
> " parts;
> " Therefore the number *eight* is an *even* number."

71 Thoſe ſteps always followed, though in familiar caſes we do not always attend to them.

IV. Here it may be obſerved, that where the general idea, to which particular objects are referred, is very familiar to the mind, and frequently in view; this reference, and the application of the general name, ſeem to be made without any apparatus of reaſoning. When we ſee a horſe in the fields, or a dog in the ſtreet, we readily apply the name of the ſpecies; habit, and a familiar acquaintance with the general idea, ſuggeſting it inſtantaneouſly to the mind. We are not however to imagine on this account that the underſtanding departs from the uſual rules of juſt thinking. A frequent repetition of acts begets a habit; and habits are attended with a certain promptneſs of execution, that prevents our obſerving the ſeveral ſteps and gradations by which any courſe of action is accompliſhed. But in other inſtances, where we judge not by precontracted habits, as when the general idea is very complex, or leſs familiar to the mind, we always proceed according to the form of reaſoning eſtabliſhed above. A goldſmith, for inſtance, who is in doubt as to any piece of metal, whether it be of the ſpecies called *gold*, firſt examines its properties, and then comparing them with the general idea ſignified by that name, if he finds a perfect correſpondence, no longer heſitates under what claſs of metals to rank it.

72 The great importance of this branch of reaſoning;

V. Nor let it be imagined that our reſearches here, becauſe in appearance bounded to the impoſing of general names upon particular objects, are therefore trivial and of little conſequence. Some of the moſt conſiderable debates among mankind, and ſuch too as nearly regard their lives, intereſt, and happineſs, turn wholly upon this article. Is it not the chief employment of our ſeveral courts of judicature to determine in particular inſtances, what is law, juſtice, and equity? Of what importance is it in many caſes to decide aright whether an action ſhall be termed *murder* or *manſlaughter*? We ſee then that no leſs than the lives and fortunes of men depend often upon theſe deciſions. The reaſon is plain. Actions, when once referred to a general idea, draw after them all that may be affirmed of that idea; inſomuch that the determining the ſpecies of actions is all one with determining what proportion of praiſe or diſpraiſe, commendation or blame, &c. ought to follow them. For as it is allowed that murder deſerves death; by bringing any particular action under the head of murder, we of courſe decide the puniſhment due to it.

73 and the exact obſervance of it practiſed by mathematicians.

VI. But the great importance of this branch of reaſoning, and the neceſſity of care and circumſpection in referring particular objects to general ideas, is ſtill farther evident from the practice of the mathematicians. Every one who has read Euclid, knows, that he frequently requires us to draw lines through certain points, and according to ſuch and ſuch directions. The figures thence reſulting are often ſquares, parallelograms, or rectangles. Yet Euclid never ſuppoſes this from their bare appearance, but always demonſtrates it upon the ſtricteſt principles of geometry. Nor is the method he takes in any thing different from that deſcribed above. Thus, for inſtance, having defined a ſquare to be a figure bounded by four equal ſides joined together at right angles; when ſuch a figure ariſes in any conſtruction previous to the demonſtration of a propoſition, yet he never calls it by that name until he has ſhown that its ſides are equal, and all its angles right ones. Now this is apparently the ſame form of reaſoning we have before exhibited in proving *eight* to be an even number.

74 Fixed and invariable ideas, with a ſteady application of names, renders this part of knowledge both eaſy and certain.

VII. Having thus explained the rules by which we are to conduct ourſelves in ranking particular objects under general ideas, and ſhown their conformity to the practice and manner of the mathematicians: it remains only to obſerve, that the true way of rendering this part of knowledge both eaſy and certain is, by habituating ourſelves to clear and determinate ideas, and keeping them ſteadily annexed to their reſpective names. For as all our aim is to apply general words aright, if theſe words ſtand for invariable ideas that are perfectly known to the mind, and can be readily diſtinguiſhed upon occaſion, there will be little danger of miſtake or error in our reaſonings. Let us ſuppoſe that, by examining any object, and carrying our attention ſucceſſively from one part to another, we have acquainted ourſelves with the ſeveral particulars obſervable in it. If among theſe we find ſuch as conſtitute ſome general idea, framed and ſettled beforehand by the underſtanding, and diſtinguiſhed by a particular name, the reſemblance thus known and perceived neceſſarily determines the ſpecies of the object, and thereby gives it a right to the name by which that ſpecies is called. Thus four equal ſides, joined together at right angles, make up the notion of a *ſquare*. As this is a fixed and invariable idea, without which the general name cannot be applied; we never call any particular figure a *ſquare* until it appears to have theſe ſeveral conditions; and contrarily, wherever a figure is found with theſe conditions, it neceſſarily takes the name of a *ſquare*. The ſame will be found to hold in all our other reaſonings of this kind, where nothing can create any difficulty but the want of ſettled ideas. If, for inſtance, we have not determined within ourſelves the preciſe notion denoted by the word *manſlaughter*, it will be impoſſible for us to decide whether any particular action ought to bear that name: becauſe, however nicely we examine the action itſelf, yet, being ſtrangers to the general idea with which it is to be compared, we are utterly unable to judge of their agreement or diſagreement. But if we take care to remove this obſtacle, and diſtinctly trace the two ideas under conſideration, all difficulties vaniſh, and the reſolution becomes both eaſy and certain.

VIII. Thus we ſee of what importance it is towards the improvement and certainty of human knowledge, that we accuſtom ourſelves to clear and determinate ideas, and a ſteady application of words.

CHAP. III. *Of Reaſoning, as it regards the powers and Properties of Things, and the Relations of our general Ideas.*

75
The diſtinction of reaſoning, as it regards the ſciences, and as it concerns common life.

I. WE now come to the ſecond great end which men have in view in their reaſonings; namely, the diſcovering and aſcribing to things their ſeveral attributes and properties. And here it will be neceſſary to diſtinguiſh between reaſoning, as it regards the ſciences, and as it concerns common life. In the ſciences, our reaſon is employed chiefly about univerſal truths, it being by them alone that the bounds of human knowledge are enlarged. Hence the diviſion of things into various claſſes, called otherwiſe *genera* and *ſpecies*. For theſe univerſal ideas being ſet up as the repreſentatives of many particular things, whatever is affirmed of them may be alſo affirmed of all the individuals to which they belong. *Murder*, for inſtance, is a general idea, repreſenting a certain ſpecies of human actions. Reaſon tells us that the puniſhment due to it is *death*. Hence every particular action, coming under the notion of *murder*, has the puniſhment of *death* allotted to it. Here then we apply the general truth to ſome obvious inſtance; and this is what properly conſtitutes the reaſoning of common life. For men, in their ordinary tranſactions and intercourſe one with another, have, for the moſt part, to do only with particular objects. Our friends and relations, their characters and behaviour, the conſtitution of the ſeveral bodies that ſutround us, and the uſes to which they may be applied, are what chiefly engage our attention. In all theſe, we reaſon about particular things; and the whole reſult of our reaſoning is, the applying the general truths of the ſciences in the ordinary tranſactions of human life. When we ſee a viper, we avoid it. Wherever we have occaſion for the forcible action of water to move a body that makes conſiderable reſiſtance, we take care to convey it in ſuch a manner that it ſhall fall upon the object with impetuoſity. Now all this happens in conſequence of our familiar and ready application of theſe two general truths. *The bite of a viper is mortal. Water falling upon a body with impetuoſity, acts very forcibly towards ſetting it in motion.* In like manner, if we ſet ourſelves to conſider any particular character, in order to determine the ſhare of praiſe or diſpraiſe that belongs to it, our great concern is to aſcertain exactly the proportion of virtue and vice. The reaſon is obvious. A juſt determination, in all caſes of this kind, depends entirely upon an application of theſe general maxims of morality: *Virtuous actions deſerve praiſe; vicious actions deſerve blame.*

76
The ſteps by which we proceed in the reaſoning of common life.

II. Hence it appears that reaſoning, as it regards common life, is no more than the aſcribing the general properties of things to thoſe ſeveral objects with which we are more immediately concerned according as they are found to be of that particular diviſion or claſs to which the properties belong. The ſteps then by which we proceed are manifeſtly theſe. Firſt, We refer the object under conſideration to ſome general idea or claſs of things. We then recollect the ſeveral attributes of that general idea. And, laſtly, Aſcribe all thoſe attributes to the preſent object. Thus, in conſidering the character of *Sempronius*, if we find it to be of the kind called *virtuous*, when we at the ſame time reflect that a virtuous character is deſerving of eſteem, it naturally and obviouſly follows that Sempronius is ſo too. Theſe thoughts put into a *ſyllogiſm*, in order to exhibit the form of reaſoning here required, run thus:

"Every virtuous man is worthy of eſteem.
"*Sempronius* is a virtuous man:
"Therefore *Sempronius* is worthy of eſteem."

77
The connexion and dependence of the two grand branches of reaſoning one upon another.

III. By this *ſyllogiſm* it appears, that before we affirm any thing of a particular object, that object muſt be referred to ſome general idea. Sempronius is pronounced worthy of eſteem only in conſequence of his being a virtuous man, or coming under that general notion. Hence we ſee the neceſſary connexion of the various parts of reaſoning, and the dependence they have one upon another. The determining the genera and ſpecies of things is, as we have ſaid, one exerciſe of human reaſon; and here we find that this exerciſe is the firſt in order, and previous to the other, which conſiſts in aſcribing to them their powers, properties, and relations. But when we have taken this previous ſtep, and brought particular objects under general names; as the properties we aſcribe to them are no other than thoſe of the general idea, it is plain that, in order to a ſucceſsful progreſs in this part of knowledge, we muſt thoroughly acquaint ourſelves with the ſeveral relations and attributes of theſe our general ideas. When this is done, the other part will be eaſy, and requires ſcarce any labour or thought, as being no more than an application of the general form of reaſoning repreſented in the foregoing ſyllogiſm. Now, as we have already ſufficiently ſhown how we are to proceed in determining the genera and ſpecies of things, which, as we have ſaid, is the previous ſtep to this ſecond branch of human knowledge; all that is farther wanting towards a due explanation of it is, to offer ſome conſiderations as to the manner of inveſtigating the general relations of our ideas. This is the higheſt exerciſe of the powers of the underſtanding, and that by means whereof we arrive at the diſcovery of univerſal truths; inſomuch that our deductions in this way conſtitute that particular ſpecies of reaſoning which we have before ſaid regards principally the ſciences.

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IV. But that we may conduct our thoughts with ſome order and method, we ſhall begin with obſerving, that the relations of our general ideas are of two kinds: either ſuch as immediately diſcover themſelves, upon comparing the ideas one with another; or ſuch as, being more remote and diſtant, require art and contrivance to bring them into view. The relations of the firſt kind furniſh us with intuitive and ſelf-evident truths: thoſe of the ſecond are traced by reaſoning, and a due application of intermediate ideas. It is of this laſt kind that we are to ſpeak here, having deſpatched what was neceſſary with regard to the other in the Second Part. As, therefore, in tracing the more diſtant relations of things, we muſt always have recourſe to intervening ideas, and are more or leſs ſucceſsful in our reſearches according to our acquaintance with theſe ideas, and ability of applying them; and it is evident, that to make a good reaſoner, two things are principally required. *Firſt*, An extenſive knowledge of thoſe intermediate ideas, by means of which things may be compared one with another. *Secondly*, The ſkill and talent of applying them happily in all particular inſtances that come under conſideration.

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V. In order to our ſucceſsful progreſs in reaſoning, we muſt have an extenſive knowledge of thoſe intermediate ideas by means of which things may be compared one with another. For as it is not every idea that will anſwer the purpoſe of our inquiries, but ſuch only as are peculiarly related to the objects about which we reaſon, ſo as, by a compariſon with them to furniſh evident and known truths; nothing is more apparent than that the greater variety of conceptions we can call into view, the more likely we are to find ſome among them that will help us to the truths here required. And, indeed, it is found to hold in experience, that in proportion as we enlarge our views of things, and grow acquainted with a multitude of different objects, the reaſoning faculty gathers ſtrength: for, by extending our ſphere of knowledge, the mind acquires a certain force and penetration, as being accuſtomed to examine the ſeveral appearances of its ideas, and obſerve what light they caſt one upon another.

To excel in
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VI. This is the reaſon why, in order to excel remarkably in any one branch of learning, it is neceſſary to have at leaſt a general acquaintance with the whole circle of arts and ſciences. The truth of it is, all the various diviſions of human knowledge are very nearly related among themſelves, and, in innumerable inſtances, ſerve to illuſtrate and ſet off each other. And although it is not to be denied that, by an obſtinate application to one branch of ſtudy, a man may make conſiderable progreſs, and acquire ſome degree of eminence in it; yet his views will be always narrow and contracted, and he will want that maſterly diſcernment which not only enables us to purſue our diſcoveries with eaſe, but alſo, in laying them open to others, to ſpread a certain brightneſs around them. But when our reaſoning regards a particular ſcience, it is farther neceſſary that we more nearly acquaint ourſelves with whatever relates to that ſcience. A general knowledge is a good preparation, and enables us to proceed with eaſe and expedition in whatever branch of learning we apply to. But then, in the minute and intricate queſtions of any ſcience, we are by no means qualified to reaſon with advantage until we have perfectly maſtered the ſcience to which they belong.

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VII. We come now to the ſecond thing required, in order to a ſucceſsful progreſs in reaſoning; namely, the ſkill and talent of applying intermediate ideas happily in all particular inſtances that come under conſideration. And here, rules and precepts are of little ſervice. Uſe and experience are the beſt inſtructors. For, whatever logicians may boaſt of being able to form perfect reaſoners by book and rule, we find by experience, that the ſtudy of their precepts does not always add any great degree of ſtrength to the underſtanding. In ſhort, it is the habit alone of reaſoning that makes a reaſoner. And therefore the true way to acquire this talent is, by being much converſant in thoſe ſciences where the art of reaſoning is allowed to reign in the greateſt perfection. Hence it was that the ancients, who ſo well underſtood the manner of forming the mind, always began with *mathematics*, as the foundation of their philoſophical ſtudies. Here the underſtanding is by degrees habituated to truth, contracts inſenſibly a certain fondneſs for it, and learns never to yield its aſſent to any propoſition but where the evidence is ſufficient to produce full conviction. For this reaſon *Plato* has called mathematical demonſtrations the *cathartics* or purgatives of the ſoul, as being the proper means to cleanſe it from error, and reſtore that natural exerciſe of its faculties in which juſt thinking conſiſts.

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VIII. If therefore we would form our minds to a habit of reaſoning cloſely and in train, we cannot take any more certain method than the exerciſing ourſelves in mathematical demonſtrations, ſo as to contract a kind of familiarity with them. Not that we look upon it as neceſſary that all men ſhould be deep mathematicians; but that, having got the way of reaſoning which that ſtudy neceſſarily brings the mind to, they may be able to transfer it to other parts of knowledge, as they ſhall have occaſion.

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IX. But although the ſtudy of mathematics be of all others the moſt uſeful to form the mind and give it an early reliſh of truth, yet ought not other parts of philoſophy to be neglected. For there alſo we meet with many opportunities of exerciſing the powers of the underſtanding; and the variety of ſubjects naturally

rally leads us to obſerve all thoſe different turns of thinking that are peculiarly adapted to the ſeveral ideas we examine, and the truth we ſearch after. A mind thus trained acquires a certain maſtery over its own thoughts, inſomuch that it can range and model them at pleaſure, and call ſuch into view as beſt ſuit its preſent deſigns. Now in this the whole art of reaſoning conſiſts; from among a great variety of different ideas to ſingle out thoſe that are moſt proper for the buſineſs in hand, and to lay them together in ſuch order, that from plain and eaſy beginnings, by gentle degrees, and a continued train of evident truths, we may be inſenſibly led on to ſuch diſcoveries, as at our firſt ſetting out appeared beyond the reach of human underſtanding. For this purpoſe, beſides the ſtudy of mathematics before recommended, we ought to apply ourſelves diligently to the reading of ſuch authors as have diſtinguiſhed themſelves for ſtrength of reaſoning, and a juſt and accurate manner of thinking. For it is obſervable, that a mind exerciſed and ſeaſoned to truth, ſeldom reſts ſatisfied in a bare contemplation of the arguments offered by others; but will be frequently aſſaying its own ſtrength, and purſuing its diſcoveries upon the plan it is moſt accuſtomed to. Thus we inſenſibly contract a habit of tracing truth from one ſtage to another, and of inveſtigating thoſe general relations and properties which we afterwards aſcribe to particular things, according as we find them comprehended under the abſtract ideas to which the properties belong.

CHAP. IV. *Of the Forms of Syllogiſms.*

84 The figures of ſyllogiſms.

I. HITHERTO we have contented ourſelves with a general notion of ſyllogiſms, and of the parts of which they conſiſt. It is now time to enter a little more particularly into the ſubject, to examine their various forms, and lay open the rules of argumentation proper to each. In the ſyllogiſms mentioned in the foregoing chapters, we may obſerve, that the *middle term* is the ſubject of the *major* propoſition, and the predicate of the *minor*. This diſpoſition, though the moſt natural and obvious, is not however neceſſary; it frequently happening, that the middle term is the ſubject in both the premiſes, or the predicate in both; and ſometimes, directly contrary to its diſpoſition in the foregoing chapters, the predicate in the major, and the ſubject in the minor. Hence the diſtinction of ſyllogiſms into various kinds, called *figures* by logicians. For figure, according to their uſe of the word, is nothing elſe but the order and diſpoſition of the middle term in any ſyllogiſm. And as this diſpoſition is, we ſee, fourfold, ſo the figures of ſyllogiſms thence ariſing are four in number. When the middle term is the ſubject of the major propoſition, and the predicate of the minor, we have what is called the *firſt figure*; As,

> " No work of God is bad:
> " The natural paſſions and appetites of men are
> " the work of God:
> " Therefore none of them is bad."

If, on the other hand, it is the predicate of both the premiſes, the ſyllogiſm is ſaid to be the *ſecond figure*: As,

> " Whatever is bad is not the work of God:
> " All the natural paſſions and appetites of men
> " are the work of God:
> " Therefore the natural paſſions and appetites of
> " men are not bad."

Again, In the *third figure*, the middle term is the ſubject of the two premiſes: As,

> " All Africans are black:
> " All Africans are men:
> " Therefore ſome men are black."

And laſtly, By making it the predicate of the major, and ſubject of the minor, we obtain ſyllogiſms in the *fourth figure*: As,

> " The only Being who ought to be worſhipped is
> " the Creator and Governor of the world:
> " The Creator and Governor of the world is
> " God:
> " Therefore God is the only Being who ought to
> " be worſhipped."

85 The moods of ſyllogiſms.

II. But, beſides this fourfold diſtinction of ſyllogiſms, there is alſo a farther ſubdiviſion of them in every figure, ariſing from the *quantity* and *quality*, as they are called, of the propoſitions. By quantity we mean the conſideration of propoſitions, as univerſal or particular; by quality, as affirmative or negative.

Now as, in all the ſeveral diſpoſitions of the middle term, the propoſitions of which a ſyllogiſm conſiſts may be either univerſal or particular, affirmative or negative; the due determination of theſe, and ſo putting them together as the laws of argumentation require, conſtitute what logicians call the *moods* of ſyllogiſms. Of theſe moods there is a determinate number to every figure, including all the poſſible ways in which propoſitions differing in quantity or quality can be combined, according to any diſpoſition of the middle term, in order to arrive at a juſt concluſion.

The firſt figure has only four legitimate moods. The major propoſition in this figure muſt be univerſal, and the minor affirmative; and it has this property, that it yields concluſions of all kinds, affirmative and negative, univerſal and particular.

The ſecond figure has alſo four legitimate moods. Its major propoſition muſt be univerſal, and one of the premiſes muſt be negative. It yields concluſions both univerſal and particular, but all negative.

The third figure has ſix legitimate moods. Its minor muſt always be affirmative; and it yields concluſions both affirmative and negative, but all particular. ——Theſe are all the figures which were admitted by the inventor of ſyllogiſms, and of which, ſo far as we know, the number of legitimate moods has been aſcertained, and ſeverally demonſtrated. In *every figure* it will be found upon trial, that there are *ſixty-four* different moods of ſyllogiſm; and he who thinks it worth while to conſtruct ſo many in the *fourth* figure, always remembering that the *middle term* in each muſt be the *predicate* of the *major* and the *ſubject* of the *minor* propoſition, will eaſily diſcern what number of theſe moods are *legitimate*, and give true concluſions.

Beſides the rules that are proper to each figure, Ariſtotle has given ſome that are common to all, by which the legitimacy of ſyllogiſms may be tried.

Theſe may be reduced to five :——1. There muſt be only *three terms* in a ſyllogiſm : As each term occurs in two of the propoſitions, it muſt be preciſely the *ſame in both* ; if it be *not*, the ſyllogiſm is ſaid to have *four terms*, which makes a *vicious* ſyllogiſm. 2. The *middle term* muſt be taken *univerſally* in *one* of the premiſes. 3. Both premiſes muſt *not be particular* propoſitions, nor both *negative*. 4. The *concluſion* muſt be *particular*, if *either* of the *premiſes* be *particular* ; and *negative*, if *either* of the *premiſes* be *negative*. 5. No term can be taken *univerſally* in the *concluſion*, if it be *not* taken *univerſally* in the *premiſes*.

For underſtanding the *ſecond* and *fifth* of theſe rules, it is neceſſary to obſerve, that a term is ſaid to be taken *univerſally*, not only when it is the *ſubject* of a *univerſal* propoſition, but alſo when it is the *predicate* of a *negative* propoſition. On the other hand, a term is ſaid to be taken *particularly*, when it is either the *ſubject* of a *particular* or the *predicate* of an *affirmative* propoſition.

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viſion of
llogiſms.

III. The diviſion of ſyllogiſms according to mood and figure reſpects thoſe eſpecially which are known by the name of plain ſimple ſyllogiſms ; that is, which are bounded to three propoſitions, all ſimple, and where the extremes and middle term are connected, according to the rules laid down above. But as the mind is not tied down to any one preciſe form of reaſoning, but ſometimes makes uſe of more, ſometimes of fewer premiſes, and often takes in compound and conditional propoſitions, it may not be amiſs to take notice of the different forms derived from this ſource, and explain the rules by which the mind conducts itſelf in the uſe of them.

87
onditional
llogiſms.

IV. When in any ſyllogiſm the major is a conditional propoſition, the ſyllogiſm itſelf is termed *conditional*. Thus :

> “ If there is a God, he ought to be worſhipped :
> “ But there is a God :
> “ Therefore he ought to be worſhipped.”

In this example, the major, or firſt propoſition, is, we ſee, conditional, and therefore the ſyllogiſm itſelf is alſo of the kind called by that name. And here we are to obſerve, that all conditional propoſitions are made of two diſtinct parts : one expreſſing the condition upon which the predicate agrees or diſagrees with the ſubject, as in this now before us, *if there is a God* ; the other joining or disjoining the ſaid predicate and ſubject, as here, *he ought to be worſhipped*. The firſt of theſe parts, or that which implies the condition, is called the *antecedent* ; the ſecond, where we join or disjoin the predicate and ſubject, has the name of the *conſequent*.

88
round of
lation in
nditional
llogiſms.

V. In all propoſitions of this kind, ſuppoſing them to be exact in point of form, the relation between the antecedent and conſequent muſt ever be true and real ; that is, the antecedent muſt always contain ſome certain and genuine condition, which neceſſarily implies the conſequent ; for otherwiſe the propoſition itſelf will be falſe, and therefore ought not to be admitted into our reaſonings. Hence it follows, that when any conditional propoſition is aſſumed, if we admit the antecedent of that propoſition, we muſt at the ſame time neceſſarily admit the conſequent ; but if we reject the conſequent, we are in like manner bound to reject the antecedent. For as the antecedent always expreſſes ſome condition which neceſſarily implies the truth of the conſequent ; by admitting the antecedent, we allow of that condition, and therefore ought alſo to admit the conſequent. In like manner, if it appears that the conſequent ought to be rejected, the antecedent evidently muſt be ſo too : becauſe, as was juſt now demonſtrated, the admitting of the antecedent would neceſſarily imply the admiſſion alſo of the conſequent.

89
The two
moods of
conditional
ſyllogiſms.

VI. There are two ways of arguing in *hypothetical* ſyllogiſms, which lead to a certain and unavoidable concluſion. For as the major is always a conditional propoſition, conſiſting of an antecedent and a conſequent ; if the minor admits the antecedent, it is plain that the concluſion muſt admit the conſequent. This is called arguing from the admiſſion of the antecedent to the admiſſion of the conſequent, and conſtitutes that mood or ſpecies of hypothetical ſyllogiſms which is diſtinguiſhed in the ſchools by the name of the *modus ponens*, inaſmuch as by it the whole conditional propoſition, both antecedent and conſequent, is eſtabliſhed. Thus :

> “ If God is infinitely wiſe, and acts with perfect
> “ freedom, he does nothing but what is beſt :
> “ But God is infinitely wiſe, and acts with per-
> “ fect freedom :
> “ Therefore he does nothing but what is beſt.”

Here we ſee the antecedent or firſt part of the conditional propoſition is eſtabliſhed in the minor, and the conſequent or ſecond part in the concluſion ; whence the ſyllogiſm itſelf is an example of the *modus ponens*. But if now we on the contrary ſuppoſe that the minor reject the conſequent, then it is apparent that the concluſion muſt alſo reject the antecedent. In this caſe we are ſaid to argue from the removal of the conſequent to the removal of the antecedent, and the particular mood or ſpecies of ſyllogiſms thence ariſing is called by logicians the *modus tollens* ; becauſe in it both antecedent and conſequent are rejected or taken away, as appears by the following example :

> “ If God were not a Being of infinite goodneſs,
> “ neither would he conſult the happineſs of his
> “ creatures :
> “ But God does conſult the happineſs of his crea-
> “ tures :
> “ Therefore he is a Being of infinite goodneſs.

90
They include all
the legitimate ways
of arguing.

VII. Theſe two ſpecies take in the whole claſs of conditional ſyllogiſms, and include all the poſſible ways of arguing that lead to a legitimate concluſion ; becauſe we cannot here proceed by a contrary proceſs of reaſoning, that is, from the removal of the antecedent to the removal of the conſequent, or from the eſtabliſhing of the conſequent to the eſtabliſhing of the antecedent. For although the antecedent always expreſſes ſome real condition, which, once admitted, neceſſarily implies the conſequent, yet it does not follow that there is therefore no other condition ; and if ſo, then, after removing the antecedent, the conſequent may ſtill hold, becauſe of ſome other determination that infers it. When we ſay, *If a ſtone is expoſed ſome time to the rays of the ſun, it will contract a certain degree of heat* ; the propoſition is certainly true ; and, admitting the antecedent, we muſt alſo admit the conſequent. But as there are other ways by which a ſtone may gather heat, it will not follow, from the ceaſing of the before-mentioned condition, that therefore the conſequent cannot take place. In other words, we cannot argue: *But the ſtone has not been expoſed to the rays of the ſun; therefore neither has it any degree of heat:* Inaſmuch as there are a great many other ways by which heat might have been communicated to it. And if we cannot argue from the removal of the antecedent to the removal of the conſequent, no more can we from the admiſſion of the conſequent to the admiſſion of the antecedent: becauſe, as the conſequent may flow from a great variety of different ſuppoſitions, the allowing of it does not determine the preciſe ſuppoſition, but only that ſome one of them muſt take place. Thus in the foregoing propoſition, *If a ſtone is expoſed ſome time to the rays of the ſun, it will contract a certain degree of heat;* admitting the conſequent, viz. *that it has contracted a certain degree of heat*, we are not therefore bound to admit the antecedent, *that it has been ſome time expoſed to the rays of the ſun:* becauſe there are many other cauſes whence that heat may have proceeded. Theſe two ways of arguing, therefore, hold not in conditional ſyllogiſms.

91 The manner of arguing in disjunctive ſyllogiſms.

VIII. As from the major's being a conditional propoſition, we obtain the ſpecies of conditional ſyllogiſms: ſo, where it is a disjunctive propoſition, the ſyllogiſm to which it belongs is alſo called *disjunctive*, as in the following example:

> "The world is either ſelf-exiſtent, or the work of "ſome finite, or of ſome infinite Being:
> "But it is not ſelf-exiſtent, nor the work of a finite "being:
> "Therefore it is the work of an infinite Being."

Now, a disjunctive propoſition is that, where of ſeveral predicates, we affirm one neceſſarily to belong to the ſubject, to the excluſion of all the reſt, but leave that particular one undetermined. Hence it follows, that as ſoon as we determine the particular predicate, all the reſt are of courſe to be rejected; or if we reject all the predicates but one, that one neceſſarily takes place. When, therefore, in a disjunctive ſyllogiſm, the ſeveral predicates are enumerated in the major; if the minor eſtabliſhes any one of theſe predicates, the concluſion ought to remove all the reſt; or if, in the minor, all the predicates but one are removed, the concluſion muſt neceſſarily eſtabliſh that one. Thus, in the disjunctive ſyllogiſm given above, the major affirms one of the three predicates to belong to the earth, viz. *ſelf-exiſtence*, or that it is *the work of a finite*, or that it is *the work of an infinite Being*. Two of theſe predicates are removed in the minor, viz. *ſelf-exiſtence*, and *the work of a finite being*. Hence the concluſion neceſſarily aſcribes to it the third predicate, and affirms that it is *the work of an infinite Being*. If now we give the ſyllogiſm another turn, inſomuch that the minor may eſtabliſh one of the predicates, by affirming the earth to be *the production of an infinite Being:* then the concluſion muſt remove the other two, aſſerting it to be neither *ſelf-exiſtent*, nor *the work of a finite being*. Theſe are the forms of reaſoning in theſe ſpecies of ſyllogiſms, the juſtneſs of which appears at firſt ſight: and that there can be no other, is evident from the very nature of a disjunctive propoſition.

92 Imperfect or mutilated ſyllogiſms.

IX. In the ſeveral kinds of ſyllogiſms hitherto mentioned, we may obſerve that the parts are complete; that is, the three propoſitions of which they conſiſt are repreſented in form. But it often happens, that ſome one of the premiſes is not only an evident truth, but alſo familiar and in the minds of all men; in which caſe it is uſually omitted, whereby we have an imperfect ſyllogiſm, that ſeems to be made up of only two propoſitions. Should we, for inſtance, argue in this manner:

> "Every man is mortal:
> "Therefore every king is mortal:

the ſyllogiſm appears to be imperfect, as conſiſting but of two propoſitions. Yet it is really complete; only the minor [*every king is a man*] is omitted: and left to the reader to ſupply, as being a propoſition ſo familiar and evident that it cannot eſcape him.

93 Enthymemes.

X. Theſe ſeemingly imperfect ſyllogiſms are called *enthymemes;* and occur very frequently in reaſoning, eſpecially where it makes a part of common converſation. Nay, there is a particular elegance in them, becauſe, not diſplaying the argument in all its parts, they leave ſomewhat to the exerciſe and invention of the mind. By this means we are put upon exerting ourſelves, and ſeem to ſhare in the diſcovery of what is propoſed to us. Now this is the great ſecret of fine writing, ſo to frame and put together our thoughts, as to give full play to the reader's imagination, and draw him inſenſibly into our very views and courſe of reaſoning. This gives a pleaſure not unlike to that which the author himſelf feels in compoſing. It beſides ſhortens diſcourſe, and adds a certain force and livelineſs to our arguments, when the words in which they are conveyed favour the natural quickneſs of the mind in its operations, and a ſingle expreſſion is left to exhibit a whole train of thoughts.

94 Ground of reaſoning in immediate conſequences.

XI. But there is another ſpecies of reaſoning with two propoſitions, which ſeems to be complete in itſelf, and where we admit the concluſion without ſuppoſing any tacit or ſuppreſſed judgement in the mind, from which it follows ſyllogiſtically. This happens between propoſitions, where the connexion is ſuch, that the admiſſion of the one neceſſarily and at the firſt ſight implies the admiſſion alſo of the other. For if it ſo falls out, that the propoſition on which the other depends is ſelf-evident, we content ourſelves with barely affirming it, and infer that other by a direct concluſion. Thus, by admitting an univerſal propoſition, we are forced alſo to admit of all the particular propoſitions comprehended under it, this being the very condition that conſtitutes a propoſition univerſal. If then that univerſal propoſition chances to be ſelf-evident, the particular ones follow of courſe, without any farther train of reaſoning. Whoever allows, for inſtance, *that things equal to one and the ſame thing are equal to one another*, muſt at the ſame time allow, *that two triangles, each equal to a ſquare whoſe ſide is three inches, are alſo equal between themſelves.* This argument therefore,

> "Things equal to one and the ſame thing, are equal "to one another:

"Therefore,

Of Reaſoning.

"Therefore theſe two triangles, each equal to the
"ſquare of a line of three inches, are equal be-
"tween themſelves"—

is complete in its kind, and contains all that is neceſſary towards a juſt and legitimate concluſion. For the firſt or univerſal propoſition is ſelf-evident, and therefore requires no farther proof. And as the truth of the particular is inſeparably connected with that of the univerſal, it follows from it by an obvious and unavoidable conſequence.

95
All redu i- e to ſyl- ogiſms of me one rm or ther.

XII. Now, in all caſes of this kind, where propoſitions are deduced one from another, on account of a known and evident connexion, we are ſaid to reaſon by immediate conſequence. Such a coherence of propoſitions manifeſt at firſt ſight, and forcing itſelf upon the mind, frequently occurs in reaſoning. Logicians have explained at ſome length the ſeveral ſuppoſitions upon which it takes place, and allow of all immediate conſequences that follow in conformity to them. It is however obſervable, that theſe arguments, though ſeemingly complete, becauſe the concluſion follows neceſſarily from the ſingle propoſition that goes before, may yet be conſidered as real enthymemes, whoſe major, which is a conditional propoſition, is wanting. The ſyllogiſm but juſt mentioned, when repreſented according to this view, will run as follows:

"If things equal to one and the ſame thing, are
"equal to one another; theſe two triangles, each
"equal to a ſquare whoſe ſide is three inches, are
"alſo equal between themſelves.
"But things equal to one and the ſame thing, are
"equal to one another:
"Therefore alſo theſe triangles, &c. are equal be-
"tween themſelves."

This obſervation will be found to hold in all immediate conſequences whatſoever, inſomuch, that they are in fact no more than enthymemes of hypothetical ſyllogiſms. But then it is particular to them, that the ground on which the concluſion reſts, namely its coherence with the minor, is of itſelf apparent, and ſeen immediately to flow from the rules and reaſons of logic.

96
ſorites of in ſimple llogiſms.

XIII. The next ſpecies of reaſoning we ſhall take notice of here is what is commonly known by the name of a *ſorites*. This is a way of arguing, in which a great number of propoſitions are ſo linked together, that the predicate of one becomes continually the ſubject of the next following, until at laſt a concluſion is formed, by bringing together the ſubject of the firſt propoſition, and the predicate of the laſt. Of this kind is the following argument:

"God is omnipotent:
"An omnipotent Being can do every thing poſ-
"ſible:
"He that can do every thing poſſible, can do what-
"ever involves not a contradiction:
"Therefore God can do whatever involves not a
"contradiction."

This particular combination of propoſitions may be continued to any length we pleaſe without in the leaſt weakening the ground upon which the concluſion reſts. The reaſon is, becauſe the ſorites itſelf may be reſolved into as many ſimple ſyllogiſms as there are middle terms in it; where this is found univerſally to hold, that when ſuch a reſolution is made, and the ſyllogiſms are placed in train, the concluſion of the laſt in the ſeries is alſo the concluſion of the ſorites. This kind of argument, therefore, as it ſerves to unite ſeveral ſyllogiſms into one, muſt ſtand upon the ſame foundation with the ſyllogiſms of which it conſiſts, and is indeed, properly ſpeaking, no other than a compendious way of reaſoning ſyllogiſtically.

97
A ſorites of hypothetical ſyllogiſms.

XIV. What is here ſaid of plain ſimple propoſitions may be as well applied to thoſe that are conditional; that is, any number of them may be ſo joined together in a ſeries, that the conſequent of one ſhall become continually the antecedent of the next following; in which caſe, by eſtabliſhing the antecedent of the firſt propoſition, we eſtabliſh the conſequent of the laſt, or by removing the laſt conſequent remove alſo the firſt antecedent. This way of reaſoning is exemplified in the following argument:

"If we love any perſon, all emotions of hatred to-
"wards him ceaſe:
"If all emotions of hatred towards a perſon ceaſe,
"we cannot rejoice in his misfortunes:
"If we rejoice not in his misfortunes, we certainly
"wiſh him no injury:
"Therefore, if we love a perſon, we wiſh him no
"injury."

It is evident that this ſorites, as well as the laſt, may be reſolved into a ſeries of diſtinct ſyllogiſms, with this only difference, that here the ſyllogiſms are all conditional.

98
The ground of argumentation in a dilemma.

XV. The laſt ſpecies of ſyllogiſm we ſhall take notice of in this chapter is that commonly diſtinguiſhed by the name of a *dilemma*. A dilemma is an argument by which we endeavour to prove the abſurdity or falſehood of ſome aſſertion. In order to this, we aſſume a conditional propoſition, the antecedent of which is the aſſertion to be diſproved, and the conſequent a disjunctive propoſition, enumerating all the poſſible ſuppoſitions upon which that aſſertion can take place. If then it appears, that all theſe ſeveral ſuppoſitions ought to be rejected, it is plain, that the antecedent or aſſertion itſelf muſt be ſo too. When therefore ſuch a propoſition as that before mentioned is made the major of any ſyllogiſm; if the minor rejects all the ſuppoſitions contained in the conſequent, it follows neceſſarily, that the concluſion ought to reject the antecedent, which, as we have ſaid, is the very aſſertion to be diſproved. This particular way of arguing is that which logicians call a *dilemma;* and from the account here given of it, it appears that we may in the general define it to be a hypothetical ſyllogiſm, where the conſequent of the major is a disjunctive propoſition, which is wholly taken away or removed in the minor. Of this kind is the following:

"If God did not create the world perfect in its
"kind, it muſt either proceed from want of in-
"clination, or from want of power:
"But it could not proceed either from want of in-
"clination, or from want of power:
"Therefore, he created the world perfect in its
"kind."

"kind." Or, which is the ſame thing: "It is "abſurd to ſay that he did not create the world "perfect in its kind."

99 An univerſal deſcription of it.

XVI. The nature then of a dilemma is univerſally this. The major is a conditional propoſition, whoſe conſequent contains all the ſeveral ſuppoſitions upon which the antecedent can take place. As therefore theſe ſuppoſitions are wholly removed in the minor, it is evident that the antecedent muſt be ſo too; inſomuch that we here always argue from the removal of the conſequent to the removal of the antecedent. That is, a dilemma is an argument in the *modus tollens* of hypothetical ſyllogiſms, as logicians love to ſpeak. Hence it is plain, that if the antecedent of the major is an affirmative propoſition, the concluſion of the dilemma will be negative; but if it is a negative propoſition, the concluſion will be affirmative.

CHAP. V. *Of Induction.*

100 Reaſon at firſt employed about particulars;

I. ALL reaſoning proceeds ultimately from firſt truths, either ſelf-evident or taken for granted; and the firſt truths of ſyllogiſtic reaſonings are *general* propoſitions. But except in the mathematics, and ſuch other ſciences as, being converſant about mere ideas, have no immediate relation to things without the mind, we cannot aſſume as truths propoſitions which are general. The mathematician indeed may be conſidered as taking his ideas from the beginning in their *general* form. Every *propoſition* compoſed of ſuch ideas is therefore general; and thoſe which are theoretic are reducible to two parts or *terms*, a *predicate* and a *ſubject*, with a *copula* generally affirmative. If the agreement or the relation between the two terms be not immediate and ſelf-evident, he has recourſe to an *axiom*, which is a propoſition ſtill *more general*, and which ſupplies him with a third or *middle term*. This he compares firſt with the *predicate*, and then with the *ſubject*, or *vice verſa*. Theſe two compariſons, when drawn out in form, make two propoſitions, which are called the *premiſes*; and if they happen to be *immediate* and *ſelf-evident*, the *concluſion*, conſiſting of the terms of the queſtion propoſed, is ſaid to be demonſtrated. This method of reaſoning is conducted exactly in the ſyllogiſtic form explained in the preceding chapter.

II. But in ſciences which treat of things external to the mind, we cannot aſſume as *firſt principles* the moſt general propoſitions, and from them infer others leſs and leſs general till we deſcend to particulars. The reaſon is obvious. Every thing in the univerſe, whether of mind or body, preſents itſelf to our obſervation in its individual ſtate; ſo that *perception* and *judgement* employed in the inveſtigation of truth, whether *phyſical*, *metaphyſical*, *moral*, or *hiſtorical*, have in the firſt place to encounter with PARTICULARS. "With theſe reaſon begins, or ſhould begin, its operations. It obſerves, tries, canvaſſes, examines, and compares them together, and judges of them by ſome of thoſe native evidences and original lights, which, as they are the firſt and indiſpenſable inlets of knowledge to the mind, have been called the *primary principles of truth*." See METAPHYSICS.

101 from which, b *induction* aſcends t generals axioms.

III. "By ſuch acts of obſervation and judgement, diligently practiſed and frequently repeated, on many *individuals* of the ſame claſs or of a ſimilar nature, noting their agreements, marking their differences however minute, and rejecting all inſtances which, however ſimilar in appearance, are not in effect the ſame, REASON, with much labour and attention, extracts ſome *general laws* reſpecting the powers, properties, qualities, actions, paſſions, virtues, and relations of *real things*. This is no haſty, premature, *notional* abſtraction of the mind, by which images and ideas are formed that have no archetypes in nature: it is a rational, operative, experimental proceſs, inſtituted and executed upon the conſtitution of beings, which in part compoſe the univerſe. By this proceſs REASON advances from *particulars* to *generals*, from *leſs general* to *more general*, till by a ſeries of ſlow progreſſion, and by regular degrees, it arrive at the *moſt general* notions, called FORMS or FORMAL CAUSES (C). And by *affirming* or *denying* a genus of a ſpecies, or an accident of a ſubſtance or claſs of ſubſtances, through all the ſtages of the gradation, we form *concluſions*, which, if logically drawn, are AXIOMS (D), or general propoſitions ranged one above another,

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(C) Qui FORMAS novit, is, quæ adhuc non facta ſunt, qualia nec naturæ viciſſitudines, nec experimentales induſtriæ unquam in actum produxiſſent, nec cogitationem humanam ſubituræ fuiſſent, detegit et educit. *Baconi Nov. Org.*

(D) The word axiom, αξιωμα, literally ſignifies *dignity*: Hence it is uſed metaphorically to denote a *general truth* or maxim, and ſometimes any truth that is ſelf-evident, which is called a *dignity* on account of its importance in a proceſs of reaſoning. The axioms of Euclid are propoſitions extremely general; and ſo are the axioms of the Newtonian philoſophy. But theſe two kinds of axioms have very different origins. The former appear true upon a bare contemplation of our ideas; whereas the latter are the reſult of the moſt laborious induction. Lord Bacon therefore ſtrenuouſly contends that they ſhould never be taken upon conjecture, or even upon the authority of the learned; but that, as they are the general principles and grounds of all learning, they ſhould be canvaſſed and examined with the moſt ſcrupulous attention, "ut axiomatum corrigatur iniquitas, quæ plerumque in exemplis vulgatis fundamentum habent:" *De Augm. Sc.* lib. ii. cap. 2. "Atque illa ipſa putativa principia ad rationes reddendas compellare decrevimus, quouſque planè conſtant:" *Diſtrib. Operis.*——Dr Tatham makes a diſtinction between axioms *intuitive* and axioms *ſelf-evident*. *Intuitive* axioms, according to him, paſs through the firſt inlets of knowledge, and flaſh direct conviction on the minds, as external objects do on the ſenſes, of all men. Other axioms, though not intuitive, may be properly ſaid to be *ſelf-evident*; becauſe, in their formation, reaſon judges by ſingle compariſons without the help of a third idea or middle term; ſo that they have their evidence in themſelves, and though inductively framed they cannot be ſyllogiſtically proved. If this diſtinction be juſt, and we think it is, only *particular* truths can be intuitive axioms.

another, till they terminate in thoſe that are UNIVERSAL.

102 e pro- eſs of in- uction ex- plified physics. IV. "Thus, for inſtance, *the evidence of the external ſenſes* is obviouſly the PRIMARY PRINCIPLE from which all phyſical knowledge is derived. But, whereas nature begins with *cauſes*, which, after a variety of changes, produce *effects*, the ſenſes open upon the *effects*, and from them, through the ſlow and painful road of experiment and obſervation, aſcend to *cauſes*. By *experiments* and *obſervations* ſkilfully choſen, artfully conducted, and judiciouſly applied, the philoſopher advances from one ſtage of inquiry to another in the rational inveſtigation of the *general cauſes* of phyſical truth. From different experiments and obſervations made on the ſame individual ſubject, and from the ſame experiments and obſervations made on different ſubjects of the ſame kind, by comparing and judging, he diſcovers ſome *qualities*, *cauſes*, or *phenomena*, which, after carefully diſtinguiſhing and rejecting all contradictory inſtances that occur, he finds common to *many*. Thus from many collateral compariſons and judgements formed upon *particulars*, he aſcends to *generals*; and by a repetition of the ſame induſtrious proceſs and laborious inveſtigation, he advances from *general* to *more general*, till at laſt he is enabled to form a few of the *moſt general*, with their attributes and operations, into AXIOMS or *ſecondary principles*, which are the well-founded *laws* enacted and enforced by the God of nature.—This is that juſt and philoſophic method of reaſoning which ſound logic preſcribes in this as well as in other parts of learning; by which, through the ſlow but certain road of experiment and obſervation, the mind aſcends from appearances to qualities, from effects to cauſes; and from experiments upon many particular ſubjects forms *general propoſitions* concerning the powers and properties of phyſical body.

103 xioms, ſo ſtabliſhed, pplicable all parts f learning. V. "AXIOMS ſo inveſtigated and eſtabliſhed are applicable to all parts of learning, and are the indiſpenſable, and indeed the wonderful expedients, by which, in every branch of knowledge, reaſon puſhes on its inquiries in the particular purſuit of truth: and the method of reaſoning by which they are formed, is that of true and legitimate INDUCTION; which is therefore by Lord Bacon, the beſt and ſoundeſt of logicians, called the *key of interpretation.*

VI. "Inſtead of taking his axioms arbitrarily out of the great families of the categories (ſee CATEGORY), and erecting them by his own ſophiſtical invention into the principles upon which his diſputation was to be employed, had the analytical genius of Ariſtotle preſented us with the laws of the true INDUCTIVE LOGIC, by which AXIOMS are philoſophically formed, and had he with his uſual ſagacity given us an example of it in a ſingle branch of ſcience; he would have brought to the temple of truth, an offering more valuable than he has done by the aggregate of all his logic and philoſophical productions.

104 duction or to finition. VII. "In all ſciences, except the mathematics, it is only after the INDUCTIVE proceſs has been induſtriouſly purſued and ſucceſsfully performed, that DEFINITION may be logically and uſefully introduced, by beginning with the *genus*, paſſing through all the graduate and ſubordinate ſtages, and marking the *ſpecific difference* as it deſcends, till it arrive at the *individual*, which is the ſubject of the queſtion. And by adding an *affirmation* or *negation* of the attribute of the *genus* or the *ſpecies* or *individual*, or of a general *accident* on the particular *ſubſtance* ſo defined, making the definition a propoſition, the truth of the queſtion will be logically ſolved without any farther proceſs. So that inſtead of being the *firſt*, as employed by the logic in common uſe, *definition* may be the *laſt* act of reaſon in the ſearch of truth in general.

105 [illegible] logiſm. VIII. "Theſe AXIOMS or general propoſitions, thus *inductively* eſtabliſhed, become another ſpecies of PRINCIPLES, which may be properly called SECONDARY, and which lay the foundation of the ſyllogiſtic method of reaſoning. When theſe are formed, but not before, we may ſafely admit the maxim with which logicians ſet out in the exerciſe of their art, as the great hinge on which their reaſoning and diſputation turn: *From truths that are already known, to derive others which are not known.* Or, to ſtate it more comprehenſively, ſo as to apply to probable as well as to ſcientific reaſoning—*From truths which are better known, to derive others which are leſs known.* Philoſophically ſpeaking, ſyllogiſtic reaſoning is, under *general propoſitions* to reduce others which are *leſs general* or which are *particular*; for the *inferior* ones are known to be true, only as we trace their connexion with the *ſuperior*. Logically ſpeaking, it is, To predicate a *genus* of a *ſpecies* or *individual* comprehended under it, or an *accident* of the *ſubſtance* in which it is inherent.

106 Induction and ſyllogiſm totally different. IX. "Thus INDUCTION and SYLLOGISM are the two methods of *direct reaſoning* correſponding to the two kinds of principles, *primary* and *ſecondary*, on which they are founded, and by which they are reſpectively conducted. In both methods, indeed, reaſon proceeds by *judging* and *comparing*, but the proceſs is different throughout; and though it may have the ſanction of Ariſtotle, an *inductive ſyllogiſm* is a ſoleciſm.

107 Induction the foundation of ſyllogiſm. X. "Till general truths are aſcertained by induction, the *third* or *middle terms* by which ſyllogiſms are made are nowhere ſafely to be found. So that another poſition of the Stagyrite, *that ſyllogiſm is naturally prior in order to induction*, is equally unfounded; for *induction* does not only naturally but neceſſarily precede *ſyllogiſm*; and, except in mathematics, is in every reſpect indiſpenſable to its exiſtence; ſince, till generals are eſtabliſhed, there can be neither *definition*, *propoſition*, nor *axiom*, and of courſe no ſyllogiſm. And as induction is the firſt, ſo is it the more *eſſential* and fundamental inſtrument of reaſoning: for as ſyllogiſm cannot produce its own *principles*, it muſt have them from induction; and if the general propoſitions or ſecondary principles be imperfectly or infirmly eſtabliſhed, and much more if they be taken at hazard, upon authority, or by arbitrary aſſumption like thoſe of Ariſtotle, all the ſyllogizing in the world is a vain and uſeleſs logomachy, only inſtrumental to the multiplication of falſe learning, and to the invention and confirmation of error. The truth of ſyllogiſms depends ultimately on the truth of axioms, and the truth of axioms on the ſoundneſs of inductions (E)."—But though induction is

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(E) This chapter is almoſt wholly taken from *Tatham's Chart and Scale of Truth*; a work which, notwithſtanding

108 Why we have treated of ſyllogiſm firſt.

prior in order, as well as ſuperior in utility, to ſyllogiſm, we have thought it expedient to treat of it laſt; both becauſe ſyllogiſm is an eaſier exerciſe of the reaſoning faculty than induction, and becauſe it is the method of mathematics, the firſt ſcience of reaſon in which the ſtudent is commonly initiated.

Chap. VI. *Of Demonſtration.*

I. Having diſpatched what ſeemed neceſſary to be ſaid with regard to the two methods of direct reaſoning, *induction* and *ſyllogiſm*; we now proceed to conſider the laws of demonſtration. And here it muſt be acknowledged, that in ſtrict demonſtration, which removes from the mind all poſſibility of doubt or error, the inductive method of reaſoning can have no place. When the experiments and obſervations from which the general concluſion is drawn are numerous and extenſive, the reſult of this mode of reaſoning is moral certainty; and could the induction be made complete, it would be abſolute certainty, equally convincing with mathematical demonſtration. But however numerous and extenſive the obſervations and experiments may be upon which an inductive concluſion is eſtabliſhed, they muſt of neceſſity come ſhort of the number and extent of nature; which, in ſome caſes, by its immenſity, will defeat all poſſibility of their co-extenſion; and in others, by its diſtance, lies out of the reach of their immediate application. Though truth does not appear in all other departments of learning with that bold and reſiſtleſs conviction with which it preſides in the mathematical ſcience, it ſhines through them all, if not interrupted by prejudice or perverted by error, with a clear and uſeful, though inferior ſtrength. And as it is not neceſſary for the general ſafety or convenience of a traveller, that he ſhould always enjoy the heat and ſplendor of a mid-day ſun, whilſt he can with more eaſe purſue his journey under the weaker influence of a morning or an evening ray; ſo it is not requiſite, for the various concerns and purpoſes of life, that men ſhould be led by truth of the moſt redundant brightneſs. Such truth is to be had only in thoſe ſciences which are converſant about ideas and their various relations; where every thing being certainly what it appears to be, definitions and axioms ariſe from mere intuition. Here *ſyllogiſm* takes up the proceſs from the beginning; and by a ſublime intellectual motion advances from the ſimpleſt axioms to the moſt complicated ſpeculations, and exhibits truth ſpringing out of its firſt and pureſt elements, and ſpreading on all ſides into a ſyſtem of ſcience. As each ſtep in the progreſs is ſyllogiſtic, we ſhall endeavour to explain the uſe and application of ſyllogiſms in this ſpecies of reaſoning.

109 Of reaſoning by a concatenation of ſyllogiſms.

We have ſeen, that in all the different appearances they put on, we ſtill arrive at a juſt and legitimate concluſion; now it often happens, that the concluſion of one ſyllogiſm becomes a previous propoſition in another; by which means great numbers of them are ſometimes linked together in a ſeries, and truths are made to follow one another in train. And as in ſuch a concatenation of ſyllogiſms all the various ways of reaſoning that are truly concluſive may be with ſafety introduced; hence it is plain, that in deducing any truth from its firſt principles, eſpecially where it lies at a conſiderable diſtance from them, we are at liberty to combine all the ſeveral kinds of ſyllogiſms above explained, according as they are found beſt to ſuit the end and purpoſe of our inquiries. When a propoſition is thus, by means of ſyllogiſms, collected from others more evident and known, it is ſaid to be *proved;* ſo that we may in the general define the proof of a propoſition to be a ſyllogiſm, or ſeries of ſyllogiſms, collecting that propoſition from known and evident truths. But more particularly, if the ſyllogiſms of which the proofs conſiſt admit of no premiſes but definitions, ſelf-evident truths, and propoſitions already eſtabliſhed, then is the argument ſo conſtituted called a *demonſtration;* whereby it appears that demonſtrations are ultimately founded on definitions and ſelf-evident propoſitions.

110 All ſyllogiſms whatſoever reducible to the firſt figure.

II. All ſyllogiſms whatſoever, whether compound, multiform, or defective, are reducible to plain ſimple ſyllogiſms in ſome one of the four figures. But this is not all. Syllogiſms of the firſt figure, in particular, admit of all poſſible concluſions: that is, any propoſitions whatſoever, whether an univerſal affirmation or univerſal negative, a particular affirmative or particular negative, which fourfold diviſion embraces all their varieties; any one of theſe may be inferred by virtue of ſome ſyllogiſm in the firſt figure. By this means it hapens that the ſyllogiſms of all the other figures are reducible alſo to ſyllogiſms of the firſt figure, and may be conſidered as ſtanding on the ſame foundation with them. We cannot here demonſtrate and explain the manner of this reduction, becauſe it would too much ſwell the bulk of this treatiſe. It is enough to take notice that the thing is univerſally known and allowed among logicians, to whoſe writings we refer ſuch as deſire farther ſatisfaction in this matter. This then being laid down, it is plain that any demonſtration whatſoever may be conſidered as compoſed of a ſeries of ſyllogiſms, all in the firſt figure. For, ſince all the ſyllogiſms that enter the demonſtration are reducible to ſyllogiſms of ſome one of the four figures; and ſince the ſyllogiſms of all the other figures are farther reducible to ſyllogiſms of the firſt figure, it is evident, that the whole demonſtration may be reſolved into a ſeries of theſe laſt ſyllogiſms. Let us now, if poſſible, diſcover the ground upon which the concluſion reſts in ſyllogiſms of the firſt figure; becauſe, by ſo doing, we ſhall come at an univerſal principle of certainty, whence the evidence of all demonſtrations in all their parts may be ultimately derived.

111 The ground of reaſoning in the firſt figure.

III. The rules then of the firſt figure are briefly theſe. The middle term is the ſubject of the major propoſition, and the predicate of the minor. The major is always an univerſal propoſition and the minor always affirmative. Let us now ſee what effect theſe rules will have in reaſoning. The major is an univerſal propoſition of which the middle term is the ſubject,

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ſtanding the ruggedneſs of its ſtyle, has ſo much real merit as a ſyſtem of logic, that it cannot be too diligently ſtudied by the young inquirer who wiſhes to travel by the ſtraight road to the temple of Science.

ſubject, and the predicate of the concluſion the predicate. Hence it appears, that in the major the predicate of the concluſion is always affirmed or denied univerſally of the middle term. Again, The minor is an affirmative propoſition, whereof the ſubject of the concluſion is the ſubject, and the middle term the predicate. Here then the middle term is affirmed of the ſubject of the concluſion; that is, the ſubject of the concluſion is affirmed to be comprehended under, or to make a part of, the middle term. Thus then we ſee what is done in the premiſes of a ſyllogiſm of the firſt figure. The predicate of the concluſion is univerſally affirmed or denied of ſome idea. The ſubject of the concluſion is affirmed to be or to make a part of that idea. Hence it naturally and unavoidably follows, that the predicate of the concluſion ought to be affirmed or denied of the ſubject. To illuſtrate this by an example, we ſhall reſume one of the ſyllogiſms of the firſt chapter.

"Every creature poſſeſſed of reaſon and liberty is accountable for his actions:
"Man is a creature poſſeſſed of reaſon and liberty:
"Therefore man is accountable for his actions."

Here, in the firſt propoſition, the predicate of the concluſion, *accountableneſs*, is affirmed of all creatures that have reaſon and liberty. Again, In the ſecond propoſition, *man*, the ſubject of the concluſion, is affirmed to be or to make a part of this claſs of creatures. Hence the concluſion neceſſarily and unavoidably follows, viz. that man is accountable for his actions; becauſe, if reaſon and liberty be that which conſtitutes a creature accountable, and man has reaſon and liberty, it is plain he has that which conſtitutes him accountable. In like manner, where the major is a negative propoſition, or denies the predicate of the concluſion univerſally of the middle term, as the minor always aſſerts the ſubject of the concluſion to be or make a part of that middle term, it is no leſs evident that the predicate of the concluſion ought in this caſe to be denied of the ſubject. So that the ground of reaſoning, in all ſyllogiſms of the firſt figure, is manifeſtly this: "Whatever may be affirmed univerſally of any idea, may be affirmed of every or any number of particulars comprehended under that idea." And again: "Whatever may be denied univerſally of any idea, may be in like manner denied of every or any number of its individuals. Theſe two propoſitions are called by logicians the *dictum de omni*, and *dictum de nullo;* and are indeed the great principles of ſyllogiſtic reaſoning, inaſmuch as all concluſions whatſoever reſt immediately upon them, or upon propoſitions deduced from them. But what adds greatly to their value is, that they are really ſelf-evident truths, and ſuch as we cannot gainſay without running into an expreſs contradiction. To affirm, for inſtance, that *no man is perfect*, and yet argue that *ſome men are perfect;* or to ſay that *all men are mortal*, and yet that *ſome men are not mortal*, is to aſſert a thing to be and not to be at the ſame time.

112
Demonſtration an infallible guide to truth and certainty.

IV. And now we may affirm, that, in all ſyllogiſms of the firſt figure, if the premiſes are true, the concluſion muſt needs be true. If it be true that the predicate of the concluſion, whether affirmative or negative, agree univerſally to ſome idea; and if it be alſo true that the ſubject of the concluſion is a part of or comprehended under that idea; then it neceſſarily follows, that the predicate of the concluſion agrees alſo to the ſubject. For to aſſert the contrary, would be to run counter to ſome one of the two principles before eſtabliſhed; that is, it would be to maintain an evident contradiction. And thus we are come at laſt to the point we have been all along endeavouring to eſtabliſh; namely, that every propoſition which can be demonſtrated is neceſſarily true. For as every demonſtration may be reſolved into a ſeries of ſyllogiſms all in the firſt figure; and as in any one of theſe ſyllogiſms, if the premiſes are true, the concluſion muſt needs be ſo too; it evidently follows, that if all the ſeveral premiſes are true, all the ſeveral concluſions are ſo, and conſequently the concluſion alſo of the laſt ſyllogiſm, which is always the propoſition to be demonſtrated. Now that all the premiſes of a demonſtration are true, will eaſily appear from the very nature and definition of that form of reaſoning. A demonſtration, as we have ſaid, is a ſeries of ſyllogiſms, all whoſe premiſes are either definitions, ſelf-evident truths, or propoſitions, already eſtabliſhed. Definitions are identical propoſitions, wherein we connect the deſcription of an idea with the name by which we chooſe to have that idea called, and therefore as to their truth there can be no diſpute. Self-evident propoſitions appear true of themſelves, and leave no doubt or uncertainty in the mind. Propoſitions, before eſtabliſhed, are no other than concluſions gained by one or more ſteps from definitions and ſelf-evident principles, that is, from true premiſes, and therefore muſt needs be true. Whence all the previous propoſitions of a demonſtration being, we ſee, manifeſtly true; the laſt concluſion, or propoſition to be demonſtrated, muſt be ſo too. So that demonſtration not only leads to certain truth, but we have here alſo a clear view of the ground and foundation of that certainty. For as, in demonſtrating, we may be ſaid to do nothing more than combine a ſeries of ſyllogiſms together, all reſting on the ſame bottom; it is plain that one uniform ground of certainty runs through the whole, and that the concluſions are everywhere built upon ſome one of the two principles before eſtabliſhed, as the foundation of all our reaſoning. Theſe two principles are eaſily reduced into one, and may be expreſſed thus: "Whatever predicate, whether affirmative or negative, agrees univerſally to any idea; the ſame muſt needs agree to every or any number of individuals comprehended under that idea." And thus at length we have, according to our firſt deſign, reduced the certainty of demonſtration to one ſimple and univerſal principle; which carries its own evidence along with it, and which is indeed the ultimate foundation of all ſyllogiſtic reaſoning.

113
The rules of logic furniſh a ſufficient criterion for the diſtinguiſhing between truth and falſehood.

V. Demonſtration therefore ſerving as an infallible guide to truth, and therefore on ſo ſure and unalterable a baſis, we may now venture to aſſert, that the rules of logic furniſh a ſufficient criterion for the diſtinguiſhing between truth and falſehood. For ſince every propoſition that can be demonſtrated is neceſſarily true, he is able to diſtinguiſh truth from falſehood who can with certainty judge when a propoſition is truly demonſtrated. Now, a demonſtration is, as we have ſaid, nothing more than a concatenation of ſyllogiſms, all whoſe premiſes are definitions, ſelf-evident truths, or propoſitions previouſly eſtabliſhed. To judge therefore of the validity of a demonſtration, we muſt be able to diſtinguiſh whether the definitions that enter it are genuine, and truly deſcriptive of the ideas they are meant to exhibit: whether the propoſitions aſſumed without proofs as intuitive truths have really that ſelf-evidence to which they lay claim: whether the ſyllogiſms are drawn up in due form, and agreeable to the laws of argumentation: in fine, whether they are combined together in a juſt and orderly manner, ſo that no demonſtrable propoſitions ſerve anywhere as premiſes unleſs they are concluſions of previous ſyllogiſms. Now, it is the buſineſs of logic, in explaining the ſeveral operations of the mind, fully to inſtruct us in all theſe points. It teaches the nature and end of definitions, and lays down the rules by which they ought to be framed. It unfolds the ſeveral ſpecies of propoſitions, and diſtinguiſhes the ſelf-evident from the demonſtrable. It delineates alſo the different forms of ſyllogiſms, and explains the laws of argumentation proper to each. In fine, it deſcribes the manner of combining ſyllogiſms, ſo as that they may form a train of reaſoning, and lead to the ſucceſſive diſcovery of truth. The precepts of logic, therefore, as they enable us to judge with certainty when a propoſition is duly demonſtrated, furniſh a ſure criterion for the diſtinguiſhing between truth and falſehood.

114 and extending to all caſes where a certain knowledge of truth is attainable.

VI. Perhaps it may be objected, that demonſtration is a thing very rare and uncommon, as being the prerogative of but a few ſciences, and therefore the criterion here given can be of no great uſe. But wherever, by the bare contemplation of our ideas, truth is diſcoverable, there alſo demonſtration may be attained. Now that is an abundantly ſufficient criterion which enables us to judge with certainty in all caſes where the knowledge of truth comes within our reach; for with diſcoveries, that lie beyond the limits of the human mind, we have, properly, no buſineſs or concernment. When a propoſition is demonſtrated, we are certain of its truth. When, on the contrary, our ideas are ſuch as have no viſible connection or repugnance, and therefore furniſh not the proper means of tracing their agreement or diſagreement, there we are ſure that ſcientifical knowledge is not attainable. But where there is ſome foundation of reaſoning, which yet amounts not to the full evidence of demonſtration, there the precepts of logic, by teaching us to determine aright of the degree of proof, and of what is ſtill wanting to render it full and complete, enable us to make a due eſtimate of the meaſures of probability, and to proportion our aſſent to the grounds on which the propoſition ſtands. And this is all we can poſſibly arrive at, or even ſo much as hope for, in the exerciſe of faculties ſo imperfect and limited as ours.

115 The diſtinction of demonſtration into direct and indirect.

VII Before we conclude this chapter, it may not be improper to take notice of the diſtinction of demonſtration into *direct* and *indirect*. A *direct demonſtration* is, when, beginning with definitions, ſelf-evident propoſitions, or known and allowed truths, we form a train of ſyllogiſms, and combine them in an orderly manner, continuing the ſeries through a variety of ſucceſſive ſteps, until at laſt we arrive at a ſyllogiſm whoſe concluſion is the propoſition to be demonſtrated. Proofs of this kind leave no doubt or uncertainty behind them; becauſe, all the ſeveral premiſes being true, the concluſions muſt be ſo too, and of courſe the very laſt concluſion or propoſition to be proved. The other ſpecies of demonſtration is the *indirect*, or, as it is ſometimes called, the *apagogical*. The manner of proceeding here is, by aſſuming a propoſition which directly contradicts that we mean to demonſtrate; and thence, by a continued train of reaſoning, in the way of a direct demonſtration, deducing ſome abſurdity or manifeſt untruth. For hereupon we conclude, that the propoſition aſſumed was falſe: and thence again, by an immediate conſequence, that the propoſition to be demonſtrated is true. Thus Euclid, in his third book, being to demonſtrate *that circles which touch one another inwardly have not the ſame centre*, aſſumes the direct contrary to this, viz. *that they have the ſame centre*; and thence, by an evident train of reaſoning, proves *that a part is equal to the whole*. The ſuppoſition therefore leading to this abſurdity he concludes to be falſe, viz. *that circles touching one another inwardly have the ſame centre*; and thence again immediately infers, *that they have not the ſame centre*.

116 Ground of reaſoning in indirect demonſtrations.

VIII. Now, becauſe this manner of demonſtration is accounted by ſome not altogether ſo clear and ſatisfactory; we ſhall therefore endeavour to ſhow, that it equally with the other leads to truth and certainty. Two propoſitions are ſaid to be *contradictory* one of another, when that which is aſſerted to be in the one is aſſerted not to be in the other. Thus the propoſitions, *Circles that touch one another inwardly have the ſame centre*, and *Circles that touch one another inwardly have not the ſame centre*, are *contradictories*, becauſe the ſecond aſſerts the direct contrary of what is aſſerted in the firſt. Now, in all contradictory propoſitions, this holds univerſally, That one of them is neceſſarily true, and the other neceſſarily falſe. For if it be true, that circles which touch one another inwardly have not the ſame centre; it is unavoidably falſe that they have the ſame centre. On the other hand, if it be falſe that they have the ſame centre, it is neceſſarily true that they have not the ſame centre. Since therefore it is impoſſible for them to be both true or both falſe at the ſame time; it unavoidably follows, that one is neceſſarily true, and the other neceſſarily falſe. This then being allowed, which is indeed ſelf-evident; if any two contradictory propoſitions are aſſumed, and one of them can by a clear train of reaſoning be demonſtrated to be falſe, it neceſſarily follows that the other is true. For as the one is neceſſarily true, and the other neceſſarily falſe; when we come to diſcover which is the falſe propoſition, we thereby alſo know the other to be true.

147 Indirect demonſtrations a ſure guide to certainty.

IX. Now this is preciſely the manner of an indirect demonſtration, as is evident from the account given of it above. For there we aſſume a propoſition which directly contradicts that we mean to demonſtrate; and, having by a continued ſeries of proofs ſhown it to be falſe, thence infer that it is contradictory, or the propoſition to be demonſtrated, is true. As, therefore, this laſt concluſion is certain and unavoidable; let us next inquire after what manner we come to be ſatisfied of the falſehood of the aſſumed propoſition, that ſo no poſſible doubt may remain as to the force and validity of demonſtrations of this kind. The manner then is plainly this: Beginning with the aſſumed propoſition, we, by the help of definitions, ſelf evident truths, or propoſitions already eſtabliſhed, continue a ſeries of reaſoning, in the way of a direct demonſtration, until at length we arrive at ſome abſurdity or known falſehood. Thus Euclid, in the example before mentioned, from the ſuppoſition that circles touching one another inwardly have the ſame centre, deduces *that a part is equal to the whole*. Since, therefore, by a due and orderly proceſs of reaſoning, we come at laſt to a falſe concluſion; it is manifeſt, that all the premiſes cannot be true: for, were all the premiſes true, the laſt concluſion muſt be ſo too, by what has been before demonſtrated. Now, as to all the other premiſes made uſe of in the courſe of reaſoning, they are manifeſt and known truths by ſuppoſition, as being either definitions, ſelf-evident propoſitions, or truths previouſly eſtabliſhed. The aſſumed propoſition is that only as to which any doubt or uncertainty remains. That alone, therefore, can be falſe; and indeed, from what has been already ſhown, muſt unavoidably be ſo. And thus we ſee, that in indirect demonſtrations, two contradictory propoſitions being laid down, one of which is demonſtrated to be falſe, the other, which is always the propoſition to be proved, muſt neceſſarily be true; ſo that here, as well as in the direct way of proof, we arrive at a clear and ſatisfactory knowledge of truth.

118 A particular caſe of indirect demonſtrations,

X. This is univerſally the method of reaſoning in all apogogical or direct demonſtrations. But if any propoſition is aſſumed, from which, in a direct train of reaſoning, we can deduce its contradictory; the propoſition ſo aſſumed is falſe, and the contradictory one true. For if we ſuppoſe the aſſumed propoſition to be true, then, ſince all the other premiſes that enter the demonſtration are alſo true, we ſhall have a ſeries of reaſoning conſiſting wholly of true premiſes; whence the laſt concluſion or contradictory of the aſſumed propoſition muſt be true likewiſe: ſo that by this means we ſhould have two contradictory propoſitions both true at the ſame time, which is manifeſtly impoſſible. The aſſumed propoſition, therefore, whence this abſurdity flows, muſt neceſſarily be falſe; and conſequently its contradictory, which is here the propoſition deduced from it, muſt be true. If then any propoſition is propoſed to be demonſtrated, and we *aſſume* the *contradictory* of that propoſition, and thence directly infer the propoſition to be demonſtrated; by this very means we know that the propoſition ſo inferred is true. For, ſince from an aſſumed propoſition we have deduced its contradictory, we are thereby certain that the aſſumed propoſition is falſe; and if ſo, then its contradictory, or that deduced from it, which in this caſe is the ſame with the propoſition to be demonſtrated, muſt be true.

119 The knowledge of logic indiſpenſably neceſſary to render us proper judges of demonſtration;

XI. We have a curious inſtance of this in the twelfth propoſition of the ninth book of the Elements. Euclid there propoſes to demonſtrate, *that in any ſeries of numbers, riſing from unity in geometrical progreſſion, all the prime numbers that meaſure the laſt term in the ſeries will alſo meaſure the next after unity.* In order to this, he aſſumes the contradictory of the propoſition to be demonſtrated; namely, *that ſome prime number meaſuring the laſt term in the ſeries does not meaſure the next after unity*; and thence, by a continued train of reaſoning, proves that it actually does meaſure it. Hereupon he concludes the aſſumed propoſition to be falſe; and that which is deduced from it, or its contradictory, which is the very propoſition he propoſed to demonſtrate, to be true. Now that this is a juſt and concluſive way of reaſoning, is abundantly manifeſt from what we have ſo clearly eſtabliſhed above. Whence it appears, how neceſſary ſome knowledge of the rules of logic is, to enable us to judge of the force, juſtneſs, and validity, of demonſtrations. For, though it is readily allowed, that by the mere ſtrength of our natural faculties we can at once diſcern, that of two contradictory propoſitions, the one is neceſſarily true, and the other neceſſarily falſe; yet when they are ſo linked together in a demonſtration, as that the one ſerves as a previous propoſition whence the other is deduced, it does not ſo immediately appear, without ſome knowledge of the principles of logic, why that alone, which is collected by reaſoning, ought to be embraced as true, and the other, whence it is collected, to be rejected as falſe.

120 and of itſelf ſufficient to guard us againſt error and falſe reaſoning.

XII. Having thus ſufficiently evinced the certainty of demonſtration in all its branches, and ſhown the rules by which we ought to proceed, in order to arrive at a juſt concluſion, according to the various ways of arguing made uſe of; it is needleſs to enter upon a particular conſideration of thoſe ſeveral ſpecies of falſe reaſoning which logicians diſtinguiſh by the name of *ſophiſms*. He that thoroughly underſtands the form and ſtructure of a good argument, will of himſelf readily diſcern every deviation from it. And although *ſophiſms* have been divided into many claſſes, which are all called by ſounding names, that therefore carry in them much appearance of learning; yet are the errors themſelves ſo very palpable and obvious, that it would be loſt labour to write for a man capable of being miſled by them. Here, therefore, we chooſe to conclude this part of logic: and ſhall in the next give ſome account of *Method*, which, though inſeparable from reaſoning, is nevertheleſs always conſidered by logicians as a diſtinct operation of the mind; becauſe its influence is not confined to the mere exerciſe of the reaſoning faculty, but extends in ſome degree to all the tranſactions of the underſtanding.

PART IV. OF METHOD.

121 The underſtanding ſometimes employed in putting together known truths;

WE have now done with the three firſt operations of the mind, whoſe office it is to ſearch after truth, and enlarge the bounds of human knowledge. There is yet a fourth, which regards the diſpoſal and arrangement of our thoughts, when we endeavour ſo to put them together as that their mutual connexion and dependence may be clearly ſeen. This is what logicians call *Method*, and place always the laſt in order in explaining the powers of the underſtanding; becauſe it neceſſarily ſuppoſes a previous exerciſe of our other faculties, and ſome progreſs made in knowledge before we can exert it in any extenſive degree.

II. In this view, it is plain that we muſt be beforehand well acquainted with the truths we are to combine together; otherwiſe, how could we diſcern their ſeveral connexions and relations, or ſo diſpoſe of them as their mutual dependence may require? But it often happens, that the underſtanding is employed, not in the arrangement and compoſition of known truths, but in the ſearch and diſcovery of ſuch as are unknown. And here the manner of proceeding is very different. We aſſemble at once our whole ſtock of knowledge relating to any ſubject, and, after a general ſurvey of things, begin with examining them ſeparately and by parts. Hence it comes to paſs, that whereas, at our firſt ſetting out, we were acquainted only with ſome of the grand ſtrokes and outlines of truth; by thus purſuing her through her ſeveral windings and receſſes, we gradually diſcover thoſe more inward and finer touches whence ſhe derives all her ſtrength, ſymmetry, and beauty. And here it is, that when, by a narrow ſcrutiny into things, we have unravelled any part of knowledge, and traced it to its firſt and original principles, inſomuch that the whole frame and contexture of it lies open to the view of the mind; here it is, that, taking it the contrary way, and beginning with theſe principles, we can ſo adjuſt and put together the parts as the order and method of ſcience requires.

122 Sometimes the ſearch and the very objects as yet unknown.

123 Illuſtrated by the ſimilitude of a watch.

III. But as theſe things are beſt underſtood when illuſtrated by examples, let us ſuppoſe any machine, for inſtance a watch, preſented to us, whoſe ſtructure and compoſition we are as yet unacquainted with, but want, if poſſible, to diſcover. The manner of proceeding, in this caſe, is, by taking the whole to pieces, and examining the parts ſeparately, one after another. When, by ſuch a ſcrutiny, we have thoroughly informed ourſelves of the frame and contexture of each, we then compare them together, in order to judge of their mutual action and influence. By this means we gradually trace out the inward make and compoſition of the whole, and come at length to diſcern how parts of ſuch a form, and ſo put together as we found in unravelling and taking them aſunder, conſtitute that particular machine called a *watch*, and contribute to all the ſeveral motions and phenomena obſervable in it. This diſcovery being made, we can take things the contrary way, and, beginning with the parts, ſo diſpoſe and connect them as their ſeveral uſes and ſtructures require, until at length we arrive at the whole itſelf, from the unravelling of which thoſe parts reſulted.

124 Ground of the analytic and ſynthetic methods.

IV. And as it is in tracing and examining the works of art; ſo is it, in a great meaſure, in unfolding any part of human knowledge: for the relations and mutual habitudes of things do not always immediately appear upon comparing them one with another. Hence we have recourſe to intermediate ideas; and, by means of them, are furniſhed with thoſe previous propoſitions that lead to the concluſion we are in queſt of. And if it ſo happens that the previous propoſitions themſelves are not ſufficiently evident, we endeavour, by new middle terms, to aſcertain their truth; ſtill tracing things backward, in a continual ſeries, until at length we arrive at ſome ſyllogiſm where the premiſes are firſt and ſelf-evident principles. This done, we become perfectly ſatisfied as to the truth of all the concluſions we have paſſed through, inaſmuch as they are now ſeen to ſtand upon the firm and immoveable foundation of our intuitive perceptions. And as we arrived at this certainty by tracing things backward to the original principles whence they flow; ſo may we at any time renew it by a direct contrary proceſs, if, beginning with theſe principles, we carry the train of our thoughts forward until they lead us, by a connected chain of proofs, to the very laſt concluſion of the ſeries.

125 Diviſion of method into analytic and ſynthetic.

V. Hence it appears, that, in diſpoſing and putting together our thoughts, either for our own uſe, that the diſcoveries we have made may at all times lie open to the review of the mind, or where we mean to communicate and unfold the diſcoveries to others, there are two ways of proceeding equally within our choice: for we may ſo propoſe the truths relating to any part of knowledge, as they preſented themſelves to the mind in the manner of inveſtigation; carrying on the ſeries of proofs, in a reverſe order, until they at laſt terminate in firſt principles: or, beginning with theſe principles, we may take the contrary way, and from them deduce, by a direct train of reaſoning, all the ſeveral propoſitions we want to eſtabliſh. This diverſity in the manner of arranging our thoughts gives riſe to the twofold diviſion of method eſtabliſhed among logicians: for method, according to their uſe of the word, is nothing elſe but the order and diſpoſition of our thoughts relating to any ſubject. When truths are ſo propoſed and put together as they were or might have been diſcovered, this is called the *analytic method*, or the *method of reſolution*; inaſmuch as it traces things backward to their ſource, and reſolves knowledge into its firſt and original principles. When, on the other hand, they are deduced from theſe principles, and connected according to their mutual dependence, inſomuch that the truths firſt in order tend always to the demonſtration of thoſe that follow; this conſtitutes what we call the *ſynthetic method* or *method of compoſition*. For here we proceed by gathering together the ſeveral ſcattered parts of knowledge, and combining them into one whole or ſyſtem, in ſuch manner that the underſtanding is enabled diſtinctly to follow truth through all her different ſtages and gradations.

126 Called otherwiſe the method of invention, and the method of ſcience.

VI. There is this farther to be taken notice of, in relation to theſe two ſpecies of method; that the firſt has alſo obtained the name of the *method of invention*, becauſe it obſerves the order in which our thoughts ſucceed one another in the invention or diſcovery of truth. The other, again, is often denominated the *method of doctrine* or *inſtruction*; inaſmuch as, in laying our thoughts before others, we generally chooſe to proceed in the ſynthetic manner, deducing them from their firſt principles. For we are to obſerve, that although there is great pleaſure in purſuing truth in the method of inveſtigation, becauſe it places us in the condition of the inventor, and ſhows the particular train and proceſs of thinking by which he arrived at his diſcoveries; yet it is not ſo well accommodated to the purpoſes of evidence and conviction. For, at our firſt ſetting out, we are commonly unable to divine where the analyſis will lead us; inſomuch that our reſearches are for ſome time little better than a mere groping in the dark. And even after light begins to break in upon us, we are ſtill obliged to many reviews, and f Method.

and a frequent compariſon of the ſeveral ſteps of the inveſtigation among themſelves. Nay, when we have unravelled the whole, and reached the very foundation on which our diſcoveries ſtand, all our certainty, in regard to their truth, will be found in a great meaſure to ariſe from that connexion we are now able to diſcern between them and firſt principles, taken in the order of compoſition. But in the ſynthetic manner of diſpoſing our thoughts, the caſe is quite different: for as we here begin with the intuitive truths, and advance by regular deductions from them, every ſtep of the procedure brings evidence and conviction along with it; ſo that, in our progreſs from one part of knowledge to another, we have always a clear perception of the ground on which our aſſent reſts. In communicating therefore our diſcoveries to others, this method is apparently to be choſen, as it wonderfully improves and enlightens the underſtanding, and leads to an immediate perception of truth.

VII. The logic which for ſo many ages kept poſſeſſion of the ſchools, and was deemed the moſt important of the ſciences, has long been condemned as a mere art of wrangling, of very little uſe in the purſuit of truth. Attempts have been made to reſtore it to credit, but without ſucceſs; and of late years little or no attention whatever has been paid to *the art of reaſoning* in the courſe of what is called a liberal education. As both extremes may be faulty, it ſhould ſeem that we cannot conclude this ſhort treatiſe more properly than with the following

Reflections on the Utility *of* Logic.

If Ariſtotle was not the inventor of logic, he was certainly the prince of logicians. The whole theory of ſyllogiſms he claims as his own, and as the fruit of much time and labour; and it is univerſally known, that the later writers on the art have borrowed their materials almoſt entirely from his Organon and Porphyry's Introduction. But after men had laboured near 2000 years in ſearch of truth by the help of ſyllogiſms, Lord Bacon propoſed the method of induction, as a more effectual engine for that purpoſe; and ſince his days the art of logic has gradually fallen into diſrepute.

To this conſequence many cauſes contributed. The art of ſyllogiſm is admirably calculated for wrangling; and by the ſchoolmen it was employed with too much ſucceſs, to keep in countenance the abſurdities of the Romiſh church. Under their management it produced numberleſs diſputes, and numberleſs ſects, who fought againſt each other with much animoſity without gaining or loſing ground; but it did nothing conſiderable for the benefit of human life, whilſt the method of induction has improved arts and increaſed knowledge. It is no wonder, therefore, that the exceſſive admiration of Ariſtotle, which continued for ſo many ages, ſhould end in an undue contempt: and that the high eſteem of logic, as the grand engine of ſcience, ſhould at laſt make way for too unfavourable an opinion, which ſeems now prevalent, of its being unworthy of a place in a liberal education. Men rarely leave one extreme without running into the contrary: Thoſe who think according to the faſhion, will be as prone to go into the preſent extreme as their grandfathers were to go into the former; and even they who in *general* think for themſelves, when they are offended at the abuſe of any thing, are too apt to entertain prejudices againſt the *thing itſelf*. "In practice (ſays the learned Warburton *), logic is more a *trick* than a *ſcience*, formed rather to amuſe than to inſtruct. And in ſome ſort we may apply to the art of ſyllogiſm what a man of wit ſays of rhetoric, that it only tells us how to *name* thoſe tools which nature had before put into our hands. In the ſervice of chicane, indeed, it is a mere juggler's knot, now faſt, now looſe; and the ſchools where this legerdemain was exerciſed in great perfection are full of the ſtories of its wonders." The authority of Warburton is great; but it may be counterbalanced by another, which, on ſubjects of this nature, is confeſſedly greater.

"Laying aſide prejudice, whether faſhionable or unfaſhionable, let us conſider (ſays Dr Reid †) whether logic is or may be made ſubſervient to any good purpoſe. Its profeſſed end is, to teach men to think, to judge, and to reaſon, with preciſion and accuracy. No man will ſay this is a matter of little importance: the only thing therefore that can admit of doubt is, whether it can be taught?

"To reſolve this doubt, it may be obſerved, that our rational faculty is the gift of God, given to men in very different meaſures: Some have a large portion, ſome a leſs; and where there is a remarkable defect of the natural power, it cannot be ſupplied by any culture. But this natural power, even where it is the ſtrongeſt, may lie dead for want of the means of improvement. Many a ſavage may have been born with as good faculties as a *Newton*, a *Bacon*, or an *Ariſtotle*; but their talents were buried by having never been put to uſe, whilſt thoſe of the philoſophers were cultivated to the beſt advantage. It may likewiſe be obſerved, that the chief mean of improving our rational power, is the vigorous exerciſe of it in various ways and on different ſubjects, by which the habit is acquired of exerciſing it properly. Without ſuch exerciſe, and good ſenſe over and above, a man who has ſtudied logic all his life may be only a petulant wrangler, without true judgement or ſkill of reaſoning in any ſcience."

This muſt have been Locke's meaning, when in his Thoughts on Education, he ſays, "If you would have your ſon to reaſon well, let him read Chillingworth." The ſtate of things is much altered ſince Locke wrote: Logic has been much improved chiefly by his writings; and yet much leſs ſtreſs is laid upon it, and leſs time conſumed in its ſtudy. His counſel, therefore, was judicious and ſeaſonable; to wit, That the improvement of our reaſoning power is to be expected much more from an intimate acquaintance with the authors who reaſon beſt, than from ſtudying voluminous ſyſtems of ſchool logic. But if he had meant, that the ſtudy of logic was of no uſe, nor deſerved any attention, he ſurely would not have taken the pains to make ſo conſiderable an addition to it, by his *Eſſay on the Human Underſtanding*, and by his *Thoughts on the Conduct of the Underſtanding*; nor would he have remitted his pupil to *Chillingworth*, the acuteſt logician as well as the beſt reaſoner of his age."

There is no ſtudy better fitted to exerciſe and ſtrengthen the reaſoning powers than that of the mathematical ſciences; becauſe there is no other branch of of ſcience which gives ſuch ſcope to long and accurate trains of reaſoning, or in which there is ſo little room for authority or prejudice of any kind to give a falſe bias to the judgement. When a youth of moderate parts begins to ſtudy Euclid, every thing is new to him. His apprehenſion is unſteady: his judgement is feeble; and reſts partly upon the evidence of the thing, and partly upon the authority of his teacher. But every time he goes over the definitions, the axioms, the elementary propoſitions, more light breaks in upon him: and as he advances, the road of demonſtration becomes ſmooth and eaſy; he can walk in it firmly, and take wider ſteps, till at laſt he acquires the habit not only of underſtanding a demonſtration, but of diſcovering and demonſtrating mathematical truths.

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* [illegible] *Julian, &c.*

† *Appendix to Lord Kames's Sketch on the Principles and Progreſs of Reaſon.*

It muſt indeed be confeſſed, that a man without the rules of logic may acquire a habit of reaſoning juſtly in *mathematics*, and perhaps in any other ſcience. Good ſenſe, good examples, and aſſiduous exerciſe, may bring a man to reaſon juſtly and acutely in his own profeſſion without rules. But whoever thinks, that from this conceſſion he may infer the inutility of logic, betrays by this inference a great want of that art; for he might as well infer, becauſe a man *may* go from Edinburgh to London by the way of Paris, that therefore *any other* road is uſeleſs.

There is perhaps no art which may not be acquired, in a very conſiderable degree, by example and practice, without reducing it to rules. But practice joined with rules may carry a man forward in his art farther and more quickly than practice without rules.—Every ingenious artiſt knows the utility of having his art reduced to rules, and thereby made a ſcience. By rules he is enlightened in his practice, and works with more aſſurance. They enable him ſometimes to correct his own errors, and often to detect the errors of others; and he finds them of great uſe to confirm his judgement, to juſtify what is right, and to condemn what is wrong. Now mathematics are the nobleſt *praxis* of *logic*. Through them we may perceive how the ſtated forms of ſyllogiſm are exemplified in one ſubject, namely the predicament of quantity; and by marking the force of theſe forms, as they are there applied, we may be enabled to apply them of ourſelves elſewhere. Whoever, therefore, will ſtudy mathematics with this view, will become not only by mathematics a more expert *logician*, and by logic a more rational *mathematician*, but a wiſer philoſopher, and an acuter reaſoner, in all the poſſible ſubjects either of ſcience or deliberation. But when mathematics, inſtead of being applied to this excellent purpoſe, are uſed not to exemplify logic, but to ſupply its place; no wonder if logic fall into contempt, and if mathematics, inſtead of furthering ſcience, become in fact an obſtacle. For when men, knowing nothing of that reaſoning which is *univerſal*, come to attach themſelves for years to a *ſingle ſpecies*, a ſpecies wholly involved in *lines* and *numbers*, the mind becomes incapacitated for reaſoning at large, and eſpecially in the ſearch of *moral truth*. The object of mathematics is *demonſtration;* and whatever in that ſcience is not demonſtration, is nothing, or at leaſt below the ſublime inquirer's regard. *Probability*, through its almoſt infinite degrees, from ſimple ignorance up to abſolute certainty, is the *terra incognita* of the mathematician. And yet here it is that the great *buſineſs* of the human mind is carried on in the ſearch and diſcovery of all the important truths which concern us as reaſonable beings. And here too it is that all its *vigour* is exerted: for to proportion the aſſent to the probability accompanying every varying degree of moral evidence, requires the moſt enlarged and ſovereign exerciſe of reaſon.

In reaſonings of this kind, will any man pretend that it is of no uſe to be well acquainted with the various powers of the mind by which we reaſon? Is it of no uſe to reſolve the various kinds of reaſoning into their ſimple elements; and to diſcover, as far as we are able, the rules by which theſe elements are combined in judging and in reaſoning? Is it of no uſe to mark the various fallacies in reaſoning, by which even the moſt ingenious men have been led into error? It muſt ſurely betray great want of underſtanding, to think theſe things uſeleſs or unimportant. Now theſe are the things which logicians have attempted; and which they have executed—not indeed ſo completely as to leave no room for improvement, but in ſuch a manner as to give very conſiderable aid to our reaſoning powers. That the principles they have laid down with regard to definition and diviſion, with regard to the converſion and oppoſition of propoſitions, and the general rules of reaſoning, are not without uſe, is ſufficiently apparent from the blunders committed daily by thoſe who diſdain any acquaintance with them.

Although the art of categorical ſyllogiſm is confeſſedly little fitted for the diſcovery of unknown truth, it may yet be employed to excellent purpoſes, as it is perhaps the moſt compendious method of detecting a fallacy. A man in queſt of unknown truths muſt generally proceed by the way of induction, from effects to cauſes; but he, who as a teacher is to inculcate any ſyſtem upon others, begins with one or more ſelf-evident truths, and proceeds in the way of demonſtration, to the concluſion which he wiſhes to eſtabliſh. Now every demonſtration, as has been already obſerved, may be reſolved into a ſeries of ſyllogiſms, of which the concluſion of the preceding always enters into the premiſes of that which follows: and if the firſt principles be clear and evident, and every ſyllogiſm in ſome legitimate mode and figure, the concluſion of the whole muſt infallibly be admitted. But when the demonſtration is thus broken into parts; if we find that the concluſion of one ſyllogiſm will not, without altering the meaning of the terms, enter legitimately into the premiſes of that which ſhould immediately follow; or, ſuppoſing it to make one of the premiſes of a *new* ſyllogiſm, if we find that the concluſion, reſulting from the whole ſeries *thus* obtained, is different from that of the demonſtration; we may, in either of theſe caſes, reſt aſſured that the author's reaſoning is fallacious, and leads to error; and that if it carried an appearance of conviction before it was thus reſolved into its elementary parts, it muſt have been owing to the inability of the mind to comprehend at *once* a long train of arguments. Whoever wiſhes to ſee the ſyllogiſtic art employed for this purpoſe, and to be convinced of the truth of what we have ſaid reſpecting its utility, may conſult the excellent writer recommended by Locke, who, in places innumerable of his incomparable book, has, without pedantry, even in that pedantic age, made the happieſt application of the rules of logic for unravelling the ſophiſtry of his Jeſuitical antagoniſt.

Upon the whole, then, though we readily acknowledge that much time was waſted by our forefathers in ſyllogiſtic wrangling, and what might with little impropriety be termed the *mechanical* part of logic; yet the art of forming and examining arguments is certainly an attainment not unworthy the ambition of that being whoſe higheſt honour is to be endued with reaſon.

LOGISTÆ, certain officers at Athen, in number ten, whoſe buſineſs conſiſted in receiving and paſſing the accounts of magiſtrates when they went out of office. The *logiſtæ* were elected by lot, and had ten *euthyni* or auditors of accounts under them.

LOGOGRAPHY, a new method of printing, in which the types, inſtead of anſwering only to ſingle letters, are made to correſpond to whole words.

This method, though ſeemingly a retrograde proceſſion in the printing art, has lately obtained the ſanction of his majeſty's patent, and has for ſome time been actually put in execution in the way of trade, apparently with advantage to the proprietors. In the year 1783, a treatiſe upon this ſubject appeared by Henry Johnſon, in which the origin as well as the utility of the art are fully laid down, and the matter ſet forth in ſuch a light as can ſcarce allow us to doubt that it is an improvement in the art. Mr Johnſon informs us, that about five years before, viz. in the year 1778, intending to publiſh a daily liſt of blanks and prizes in the lottery numerically arranged, he found it could not be accompliſhed in time by the ordinary way of printing. On this account he procured types of two, three, or more figures as was neceſſary for his purpoſe; and thus any entire number might as readily be taken up as if it had been a ſingle type. His next attempt was in forming ſome large mercantile tables of pounds, ſhillings, pence, and farthings. For theſe he procured types expreſſive of any ſum of money ready compoſed and united, "by which (ſays he) every ſpecies of figure-printing could be performed for the tenth part of the coſt, printers always charging it double the price of letter-printing." Having thus ſucceeded to his wiſh in his two firſt attempts, he next began to conſider if the method could not be applied to words; and in this alſo the ſucceſs was equal.

The properties of the logographic art, according to our author, are, 1. That the compoſitor ſhall have leſs charged upon his memory than in the common way. 2. It is much leſs liable to error. 3. The type of each word is as eaſily laid hold of as that of a ſingle letter. 4. The decompoſition is much more readily performed, even by the mereſt novices, than they now decompoſe letters. 5. No extraordinary expence nor greater number of types is required in the logographic than in the common method of printing.

The firſt of theſe poſitions is proved by our author in the following manner. In the common method, the compoſitor has 150 diviſions to which there is no reference, and the printing offices are not agreed with reſpect to the mode of placing their boxes; "but under this improvement he has only to know the letters of the alphabet, and is aſſiſted with an index of them, inſomuch that the ſimplicity of the latter apparatus enables him, by a little practice, to lay his finger almoſt blindfold on the word required; and the meaneſt capacity is equal to this mental exerciſe, having little more to do than knowing by inſpection the difference between words under three and thoſe above three ſyllables; and all the apparatus being within a compaſs not a great deal more extended than common printing, for theſe reaſons he is as ſoon poſſeſſed of his type of a word as they are of a ſingle letter."

Thus the firſt and third poſitions may be ſaid to be proved; but in his proof of the ſecond, our author himſelf ſhows that his art is not infallible, by ſubſtituting the word *third* inſtead of *ſecond*. Subſtitutions of this kind, he owns, may readily take place; but ſuch errors are much more conſpicuous than literal ones, though they may be corrected with equal eaſe; "for the erroneous ſubſtitution cannot fail of being nearly equal in length to the word required; although, even otherwiſe, it would not be attended with greater diſadvantage than in the common way, and it would be rectified with greater facility."

The eaſe with which the compoſition is performed, ſhows that there muſt be an equal eaſe in performing the decompoſition; "from whence (ſays Mr Johnſon) it is further demonſtrable, that any work can be compoſed by this method nearly as ſoon as it can be deliberately read; and as to the fifth poſition, that it ſhall not require a greater expence of types, it is anſwered, that it is impoſſible for more types of letters to be wanted for this method than by any other printer according to the equal quantity of buſineſs to be performed, every office having certain known quantities of each letter called a *fount*. A printer's fount contains about 92,500 letters, and our want is not more; nay, nearer the truth, the preſent quantity for a fount containing much more of ſome letters than neceſſary, and fewer of others; which ariſes from the calculation of the quantity of each letter wanted being adhered to ſince the old ſpelling."

Our author now proceeds to demonſtrate that the number of types muſt neceſſarily decreaſe as they are combined in ſyllables, and much more when formed into words. The whole art of arranging the words conſiſts in placing them under as few diviſions as poſſible, and ſtill fewer ſubdiviſions; which is attained by the following proceſs.

1. A collection of words, with the addition of tenſes, plurals, and degrees of compariſon, amounting to more than 100,000, was made from the beſt Engliſh dictionaries:

2. Collections were made from the miſcellaneous part

of 20 newſpapers, the Spectator, and Common Prayer-book. The method was, by procuring duplicates of every ſheet, ſo that each alternate ſide might be paſted over with white paper, in order to leave the whole of the words on both ſides perfect; and thus the whole might be touched with leſs danger of injury than otherwiſe could have been done. The confuſion ariſing from the parts of other words being ſeen from the oppoſite ſide was likewiſe prevented.

3. The words, being ſeparately cut out, were then put into a caſe marked with the diviſions from one to 16, according to the number of letters contained in each word. Thus ſeveral letters were diſtinctly collected; and then each ſeparate parcel ſorted in a caſe containing 26 diviſions, marked with the letters of the alphabet, according to the commencing letter of the word; and thus all the words were ranged alphabetically, conſiſting of two, three, four, or five letters, in ſeparate parcels.

4. The ſame words were then placed together, and poſted into an alphabet, with the number of times marked to each that had occurred on the whole; that in this manner a proportion might be determined how many times particular words ought to be repeated for the printing of one ſheet, and alſo to know what words are in general uſe: There are likewiſe a number of technical terms, and favourite phraſes, a great number of times repeated almoſt by every author; but though theſe occur throughout the whole book in great proportion to the reſt, no more of them will be neceſſary than what ſuffice for a ſingle ſheet.

5. The whole of the above might be done without the trouble juſt mentioned, by poſting every word at once into a triformed alphabet; becauſe the ſubdiviſions of the ſecond and third commencing letter of each word for references are now obtained, and thus can eaſily be placed in its proper diviſion, and may be marked as often as it occurs, without repeating the ſame word; whence we plainly ſee the eaſe and expedition of it, from the facility and expedition of poſting every word from a leaf in any book. Before ſuch ſubdiviſions were known, they could only have been placed under the firſt commencing letter of the word; which would cauſe ſuch a multiplicity of repetitions, that it would take up more time, be far more liable to error, and require more ſubordinate poſtings to bring them into arrangement; ſo that they may be found more eaſily than by the above proceedings. Thus alſo a collection will be obtained of ſingle and double words, which are conſtantly required from 20 to 400 or 500 times in the printing one ſheet of any work whatever; and which alone would abridge the compoſitor's work near one-third. This ſecond proceſs likewiſe enabled the author to reject, out of the firſt collection, obſolete words, technical terms, &c. which reduces the original collection to one-fifth part.

6. By proceeding in this manner, ſeveral ſpecies of words are omitted in the founts. 1. Obſolete words; becauſe they occur ſo ſeldom, that the difference of time loſt in compoſing them in the ordinary method would be imperceptible. 2. Technical terms, names of places, animals, &c.; though, for any particular work, the terms peculiar to it may be added to the fount in a biformed alphabet apart. 3. Real compounds, or words that may be compounded of others, are alſo rejected; becauſe we actually have the words already, and they may be joined with ſufficient expedition, though the ſpaces are annexed to each, by being conſtructed accordingly. 4. Thoſe of the ſame ſpelling are likewiſe omitted, though they bear different ſignifications, for obvious reaſons.

7. The variation of tenſes, degrees of compariſon, and numerous words in the Engliſh language, having in general, the ſame terminations, ſuch as ED, ING, LY, MENT, NESS, &c. an alphabet may be formed of ſuch a kind as is capable of being annexed to the abſolute words or radices, as expeditiouſly as the whole word could be found in the fount, from its being thereby ſo much leſs extended. Thus, by dividing ſeveral words into their radices and terminations, many other words may be formed from their radix by the addition of various terminations, and each termination may be added to other radices to which they are applicable.

8. Some radices are imperfect, viz. ſuch as end with the vowel *e*, which muſt therefore be added in the uſual way of compoſition. Thus, in the word *adore*, the radix is *ador*, to which the terminations *es*, *ed*, *eſt*, *eth*, *er*, *ing*, may be added occaſionally.

9. By rejecting alſo the words which come under this laſt denomination, the number neceſſary for a fount is reduced to one-tenth of what it would otherwiſe be, as will appear evident from the following conſiderations: 1. There are at leaſt 42 verbs, the infinitive of which ends in *ify*; as *qualify*, *ſignify*; the radices of which are *qual*, *ſign*; the terminations are, *ifies*, *ified*, *ifying*, &c. And Mr Johnſon informs us, that by applying theſe radices to other terminations, he was enabled to diſpenſe with more than 500 words which would otherwiſe have been neceſſary. 2. For all regular verbs, no more than ſix terminations are neceſſary, viz. *s*, *eſt*, *eth*, *ed*, *es*, *ing*. There are but few irregular ones in the Engliſh language; whence it happens that 12 or 14 words may be formed from one ſingle perfect verb as a radix, and many imperfect ones ſave double that number.

10. By uſing only the ſet of terminations which may be contained in a box of two feet ſquare, the common operation of printing would be ſhortened nearly one half; and in order to find out thoſe which are moſt in uſe, and fitteſt to retain, our author digeſted them alphabetically, with the radices, words, or ſyllables, which make complete words annexed to them. Thus,

tain
——s
——ed
——ing
——ment

abs—apper—aſcer
de—dis—con
cer—cap—cur
enter—main—re—ſus, &c.

11. Thus it will be found, that out of more than 100,000 words of which the Engliſh language conſiſts, there will not be wanted much above 3500 for a complete fount. This will be very evident to any perſon who conſults a dictionary. He will there find, that a vaſt number of words require an explanation; whereas in any miſcellaneous work, there are none but what can be underſtood moſt readily either together or apart. Newſpapers retain more of the uncommon kind of words than any others. "The vocabulary (ſays our author)

or alphabet as it is called, of the Chineſe, conſiſts of above 80,000 letters or characters; yet he is admitted a maſter of the language who knows about 4000 of them, no more being in general uſe."

The expedition with which the logographic method of printing can be accompliſhed, depends eſſentially on their arrangement; which, from great numbers of experiments, our author found to be beſt accompliſhed in the following manner: 1. Words of one, two, or three ſyllables, are alphabetically placed by themſelves, including all poſſible commencing ſyllables, by which the compoſitor cannot fail of finding the word either in whole or in part, let it be what it will; and when the whole cannot be found at once, the remainder may eaſily be found in ſingle or double ſyllables among the terminations. 2. All words above three ſyllables have the ſame alphabetical arrangement; the terminations being the ſame at the bottom of each. Experience ſhows, that by a very few leſſons, the meaneſt capacity may determine the number of ſyllables, and refer to the particular caſe containing words of that number, there being conſpicuous references to each; and by thus equalizing them, any perſon may poſſeſs himſelf very expeditiouſly of what he wants. Even boys who ſcarcely knew more than the letters of the alphabet, were hardly a fortnight employed in this method, when they could at the firſt glance tell the number of letters contained in any word.

By this ſimplicity of arrangement, any intelligent perſon, who never compoſed in his life, by being placed in a room with the apparatus, could compoſe and print, without other previous inſtruction than deſiring him to remember that the words under three ſyllables, and thoſe above three, are placed in ſeparate alphabets; and that whenever he wants a word, the firſt letter is ſeen in capitals of two inches on the walls, the ſecond in letters of one inch in right lines; and where it is neceſſary to have more columns than one for ſuch ſecond letter, the third is given in red down the column, comprehending about 12 diviſions, to contain the types of the word coming under ſuch reference.

To exemplify this method as far as it can be done without actually ſeeing the apparatus, our author inſtances the two words *Above* and *Unfortunately*. In looking for the former, the firſt letter, A, is ſeen upon the wall as already mentioned; the ſecond, B, is on the caſe under it, and down that column is OVE, oppoſite to the cell containing the types of the whole word; which would be only three references inſtead of five with ſpaces, as in the common method. The other word, viz. *Unfortunately*, may be found by the ſame references, though it contains 13 letters; but "admitting that practice will give the word as ſoon as a ſingle letter, the average will be found eight for one."—Our author's explanation of the method in which this word might be compoſed, however, ſeems by no means intelligible.—"For this diſtinction in the caſes (ſays he), the alphabet, or rather marks of firſt reference in large characters on the wall, is divided into two claſſes, not as vowels and conſonants, but as follows, viz. A, Con, Diſ, E, In, O, P, S, Un, commencing references, the ſecond or ſubſequent letters of the words being in a right line from left to right, and down each column is found the remainder of the reference to the words, diſtinguiſhing always the third letter in red. The ſecond diſtinction is that for all other commencing letters, the ſecond letter of reference is in a column down, and the third letter in lines from left to right in red.

Theſe are the directions given by our author for forming a fount of words: the next requiſite is a fount of ſyllables, formed in the following method: 1. A complete ſet of two letters was obtained in all their poſſible combinations, amounting to 676. 2. Having next obtained the poſſible combination of theſe letters, viz. 17576, by retaining only all poſſible ſyllables, and words of three letters, it is reduced to the 30th part, which anſwer all the purpoſes of compoſing with ſyllables of two and three letters, for Latin, French, Engliſh, and all names of perſons, places, and things, every poſſible ſyllable being comprehended among them. Hence it forms an univerſal triformed alphabet, where Engliſh characters are uſed; from whence all partial biformed and triformed alphabets in the arrangement of Engliſh, French, Latin, and all technical matters, are drawn. Though combinations of four letters are again 26 times the number of thoſe of three letters, and five letters increaſe in the ſame ratio; yet as much as all poſſible combinations increaſe in quantity proportionate to the number of letters combined, ſo they decreaſe in the actual number of ſyllables included among them, inſomuch, that all the ſyllables of four, five, ſix, and ſeven letters together, are conſiderably fewer than the ſyllables of three letters only.—Beſides the two founts already mentioned, a third was found neceſſary for ſuch terminations as are moſt commonly followed by particular punctuations; but, after ſome conſideration, this was judged unneceſſary.

Our author now proceeds to obviate ſome objections which muſt naturally occur to one who firſt hears of his invention. Theſe are,

1. A ſingle letter damaged in a word renders the whole uſeleſs.

This is not denied by Mr Johnſon; but he contends, that the quantity of metal loſt in this manner is quite trifling.

2. How are the blanks or ſpaces in a line to be managed, as theſe are by no means equal?

To this our author replies, that, at the time of writing the pamphlet, he was undetermined whether it be moſt eligible to have ſpaces caſt along with the beginnings of words, or to ſpace them in the common manner. The former would be more expeditious; and where a greater diſtance is required, other ſpaces may be introduced in the ordinary method.

3. How is a long word at the end of a line to be divided?

This may be eaſily accompliſhed by means of the ſyllabic fount already mentioned.

4. How is the error of ſubſtituting one word for another to be rectified?

The anſwer to this is, that an error of the kind ſpecified may be corrected in the very ſame manner as is done in common printing. Long words may be divided by means of the ſyllabic fount already mentioned, and the intervals between the words may be filled up with *ſpaces* as uſual.

LOGWOOD. See HÆMATOXYLON, BOTANY and DYEING *Index*.

LOHOCH, or LOCH, in *Pharmacy*, a compoſition of a middle conſiſtence between a ſoft electuary and a ſyrup, principally uſed in diſorders of the lungs.

LOINS, in *Anatomy*, the two lateral parts of the umbilical region of the abdomen.

LOIRE, the largeſt river in France, riſes in the mountains of the Cevennes, and, after running a courſe of about 500 miles, falls into the bay of Biſcay.

LOKE, in *Mythology*, the name of one of the deities of the northern nations, anſwering to the Arimanius among the Perſians, whom they repreſent as at enmity both with gods and men, and the author of all the evils which deſolate the univerſe. Loke is deſcribed in the Edda as producing the great ſerpent which encircles the world; which ſeems to have been intended as an emblem of corruption or ſin: he alſo gives birth to Hela or death, the queen of the infernal regions; and alſo to the wolf Fenris, that monſter who is to encounter the gods and deſtroy the world.

LOKMAN the WISE, an eminent philoſopher among the Eaſterns. The Arabians ſay he was the ſon of Baura, the ſon or grandſon of a ſiſter or aunt of Job. He was an Ethiopian, and a ſlave for ſome time. It is related that he was born in the time of David, and lived till the age of the prophet Jonas. Some ſuppoſe him to have been the ſame with Æſop the mythologiſt: and indeed we find in the parables or apologues of Lokman in Arabic, many particulars that are ſeen in Æſop's fables; ſo that it is not eaſy to determine whether the Greek or the Arabian are the originals. He is ſaid to have been deformed in his perſon; but that this defect was ſufficiently made up by the perfections of his mind. Some pieces of his are extant; and he was looked upon as ſo excellent a perſon, that Mahomet has inſerted a chapter of the Koran, called after his name, in which he introduces God as ſaying, "We heretofore beſtowed wiſdom on Lokman."—It is related that he got his liberty on the following occaſion. His maſter having given him a bitter melon to eat, he ate it all. His maſter, ſurpriſed at his exact obedience, aſked, How it was poſſible for him to eat ſuch a nauſeous fruit? He anſwered, "I have received ſo many favours from you, that it is no wonder I ſhould once in my life eat a bitter melon from your hand." This generous anſwer of the ſlave ſtruck the maſter to ſuch a degree, that he immediately gave him his liberty. M. Galland tranſlated all the fables of Lokman, and Bidpai or Pilpay, a bramin philoſopher, which were publiſhed at Paris in 1724.

LOLIUM, DARNEL GRASS; a genus of plants belonging to the triandria claſs; and in the natural method ranking under the 4th order, *Gramina*. See BOTANY *Index*.

LOLLARDS, in eccleſiaſtical hiſtory, a religious ſect, differing in many religious points from the church of Rome, which aroſe in Germany about the beginning of the 14th century; ſo called, as many writers have imagined, from Walter Lollard, who began to dogmatize in 1315, and was burnt at Cologn: though others think that Lollard was no ſurname, but merely a term of reproach applied to all heretics who concealed the poiſon of error under the appearance of piety.

The monk of Canterbury derives the origin of the word Lollard among us, from *lolium*, "a tare;" as if the Lollards were the tares ſown in Chriſt's vineyard. Abelly ſays, that the word Lollard ſignifies "praiſing God," from the German *loben*, "to praiſe," and *herr*, "Lord;" becauſe the Lollards employed themſelves in travelling about from place to place, ſinging pſalms and hymns.

Others, much to the ſame purpoſe, derive *lollhard*, *lullhard*, or *lollert*, *lullert*, as it was written by the ancient Germans, from the old German word *lullen*, *lollen*, or *lallen*, and the termination *hard*, with which many of the High Dutch words end. *Lollen* ſignifies "to ſing with a low voice," and therefore Lollard is a ſinger, or one who frequently ſings; and in the vulgar tongue of the Germans it denotes a perſon who is continually praiſing God with a ſong, or ſinging hymns to his honour. The Alexians or Cellites were called *Lollards*, becauſe they were public ſingers who made it their buſineſs to inter the bodies of thoſe who died of the plague, and ſang a dirge over them in a mournful and indiſtinct tone as they carried them to the grave. The name was afterwards aſſumed by perſons that diſhonoured it; for we find, among thoſe Lollards who made extraordinary pretences to piety and religion, and ſpent the greateſt part of their time in meditation, prayer, and ſuch acts of piety, there were many abominable hypocrites, who entertained the moſt ridiculous opinions and concealed the moſt enormous vices under the ſpecious mark of this extraordinary profeſſion. And many injurious aſperſions were propagated againſt thoſe who aſſumed this name by the prieſts and monks; ſo that, by degrees, any perſon who covered hereſies or crimes under the appearance of piety, was called a *Lollard*. Thus the name was not uſed to denote any one particular ſect, but was formerly common to all perſons and all ſects who were ſuppoſed to be guilty of impiety towards God or the church, under an external profeſſion of extraordinary piety. However, many ſocieties conſiſting both of men and women under the name of *Lollards*, were formed in moſt parts of Germany and Flanders, and were ſupported partly by their manual labours, and partly by the charitable donations of pious perſons. The magiſtrates and inhabitants of the towns where theſe brethren and ſiſters reſided, gave them particular marks of favour and protection, on account of their great uſefulneſs to the ſick and needy. They were thus ſupported againſt their malignant rivals, and obtained many papal conſtitutions by which their inſtitute was confirmed, their perſons exempted from the cognizance of the inquiſitors, and ſubjected entirely to the juriſdiction of the biſhops; but as theſe meaſures were inſufficient to ſecure them from moleſtation, Charles duke of Burgundy, in the year 1472, obtained a ſolemn bull from Pope Sixtus IV. ordering that the Cellites or Lollards ſhould be ranked among the religious orders, and delivered from the juriſdiction of the biſhops; and Pope Julius II. granted them yet greater privileges in the year 1506. Moſheim informs us that many ſocieties of this kind are ſtill ſubſiſting at Cologn, and in the cities of Flanders, though they have evidently departed from their ancient rules.

Lollard and his followers rejected the ſacrifice of the maſs, extreme unction, and penances for ſin; arguing, that Chriſt's ſufferings were ſufficient. He is likewiſe ſaid to have ſet aſide baptiſm, as a thing of no effect; and repentance, as not abſolutely neceſſary, &

&c.—In England, the followers of Wickliſe were called, by way of reproach, *Lollards*, from ſome affinity there was between ſome of their tenets; though others are of opinion that the Engliſh Lollards came from Germany.

They were ſolemnly condemned by the archbiſhop of Canterbury and the council of Oxford.

LOMBARD, Peter, well known by the title of *Maſter of the Sentences*, was born at Novara in Lombardy; but being bred at Paris, he diſtinguiſhed himſelf ſo much at that univerſity, that, he firſt had the canonry of Chartres conferred on him, was ſome time tutor to Philip ſon of Louis le Gros, and laſtly obtained the ſee of Paris. He died in 1064. His work of the Sentences is looked on as the ſource of the ſcholaſtic theology of the Latin church. He wrote alſo Commentaries on the Pſalms, and on St Paul's Epiſtles.

LOMBARDS, a Scandinavian nation, who formerly ſettled in Italy, and for ſome time made a conſiderable figure.

1 Etymology of the name.

Their name of *Lombards*, or *Longobards*, is by ſome derived from the word *lack*, or *lache*, ſignifying in the German tongue *winter;* becauſe the Lombards, while in Scandinavia, lived in marſhes, or near the ſea. Others think that it comes from the two German words *langen barden*, or *helleborden*, that is, from the long halberts they were ſuppoſed to uſe in war. But Paulus Diaconus their hiſtorian, and who was himſelf a Lombard, tells us that they were called *Longobards* from the length of their beards. A nation called the *Lombards* is mentioned by Tacitus, Strabo, and Ptolemy; but theſe are different from the Lombards who afterwards ſettled in Italy, and are reckoned to be the ſame with the Gepidæ, whom the Italian Lombards almoſt exterminated. The Lombards who ſettled in Italy are firſt mentioned by Proſper Aquitanus, biſhop of Rhegium in the year 379. That writer tells us, that about this time the Lombards, abandoning the moſt diſtant coaſts of the ocean, and their native country Scandinavia, and ſeeking for new ſettlements, as they were overſtocked with people at home, firſt attacked and overcame the Vandals in Germany. They were then headed by two chiefs, Iboreus and Aion; who, dying about the year 389, were ſucceeded by Agilmund, who is commonly reckoned the firſt king of the Lombards.

2 Vandals defeated by the Lombards.

3 They ſettle in the country of the Rugians.

Before the time of Odoacer, the Lombard hiſtory affords nothing remarkable; in his time, however, they ſettled on the Danube, in the country of the Rugians, whom Odoacer had almoſt totally exterminated or carried into captivity. During their ſtay in this country, they rendered themſelves formidable to the neighbouring nations, and carried on ſucceſsful wars with the Heruli and Gepidæ. In 526, they were allowed by the emperor Juſtinian to ſettle in Pannonia; and here they made war a ſecond time with the Gepidæ. Alboinus, the Lombard king, killed the king of the Gepidæ with his own hand, put his army to the rout, and cut ſuch numbers of them in pieces, that they ceaſed from that time to be a nation. Having cauſed the deceaſed king's head to be cut off, he made a cup of his ſkull, called in the language of the Lombards *ſchala*, which he made uſe of in all public entertainments. However, having taken, among many other captives of great diſtinction, the late king's daughter, by name *Roſamunda*, he married her after the death of his former wife Clodiſvinta, the daughter of Clotaire king of France.

4 Deſtroy the Gepidæ.

By this victory Alboinus gained ſuch reputation, that his friendſhip was courted by Juſtinian; and, in conſequence of the emperor's application, a body of 6000 Lombards were ſent to the aſſiſtance of Narſes againſt the Goths. The ſucceſs of the Romans in this expedition, the invaſion of Italy by the Lombards, and their ſucceſſes in that country, have been taken notice of under the article Italy, N° 28—32. At laſt Alboinus, having made himſelf maſter of Venetia, Liguria, Æmilia, Hetruria, and Umbria, was ſlain by the treachery of his wife, in the year 575, the fourth of his reign. This princeſs was the daughter of the king of the Gepidæ, whom Alboinus had killed in battle, and made a cup of his ſkull, as above related. As he was one day feaſting at Verona, with his chief favourites and principal officers, in the height of his mirth he ſent for the queen, and, filling the deteſted cup, commanded her to drink merrily with her father. Roſamund, ſtruck with horror, hurried out of the room; and highly incenſed againſt her huſband for thus barbarouſly triumphing over the misfortunes of her family, reſolved, at all events, to make him pay dear for ſuch an inhuman and affronting conduct. Accordingly, ſhe diſcovered her intention to Helmichild the king's ſhield-bearer, a youth of great boldneſs and intrepidity. Helmichild peremptorily refuſed to imbrue his hands in the blood of his ſovereign, or to be any way acceſſory to his death; and in this reſolution he perſiſted, till he was, by a ſhameful ſtratagem, forced by the queen to a compliance: for ſhe, knowing that he carried on an intrigue with one of her ladies, placed herſelf one night in her bed, and receiving the youth, indulged him as if ſhe had been his own miſtreſs in his amorous deſires; which ſhe had no ſooner done, than diſcovering herſelf to the deceived lover, ſhe told him that he muſt now either put the king to death, or be put to death by him. Helmichild, well appriſed, that, after what he had done, his ſafety depended upon the death of the king, engaged in the treaſon, which he otherwiſe abhorred. One day, therefore, while Alboinus was repoſing in his chamber after dinner, Helmichild, with ſome others whom he had made privy to his deſign, breaking in unexpectedly, fell upon the king with their daggers. Alboinus ſtarting up at their firſt coming in, laid hold of his ſword, which he had always by him; but having in vain attempted to draw it, the queen having before hand faſtened it in the ſcabbard, he defended himſelf for ſome time with a footſtool; but was in the end overpowered, and deſpatched with many wounds.

5 Alboinus king of the Lombards aſſaſſinated at the inſtigation of his wife.

Roſamund had promiſed to Helmichild, that, as ſoon as he had deſpatched the king, ſhe would marry him, and, with her perſon, beſtow upon him the kingdom of the Lombards. The firſt part of her promiſe ſhe immediately performed; but was ſo far from being able to beſtow the crown upon him, that both of them were obliged to ſave themſelves by flight. They fled to Longinus the exarch of Ravenna, taking with them all the jewels and treaſure of the late king. Longinus received her with the greateſt marks of friendſhip and kindneſs, and aſſured her of his protection. She had not been long in Ravenna, however, before the exarch

judging that a favourable opportunity now offered of making himſelf king of Italy by her means, imparted his deſign to her, and declared his intention to marry her, provided, by ſome means or other, ſhe deſpatched Helmichild.—Roſamund, highly pleaſed with the propoſal, reſolved to ſatisfy her ambition by getting rid of the perſon whom ſhe had married in order to gratify her revenge. Accordingly, having prepared a ſtrong poiſon, ſhe mixed it with wine, and gave it to her huſband as he came out of the bath, and called for drink, according to his cuſtom. Helmichild had not half emptied the cup, when, by the ſudden and ſtrange operation which he felt in his bowels, he concluded
6 Her death. what it was; and, with his ſword pointed at the queen's breaſt, compelled her to drink the reſt. The poiſon had the ſame effect on both; for they died in a few hours. Longinus, on the death of the queen, laid aſide all thoughts of making himſelf king of Italy, and ſent the king's treaſure to Conſtantinople, together with Albiſoinda, the daughter of Alboinus by Roſamund, whom ſhe had brought alone with her.

After the death of Alboinus, the Lombards choſe Clephis, one of the nobility, for their king. He was murdered after a ſhort reign of 18 months; upon which enſued an interregnum of 10 years, as related under
7 Monarchy abolished. the article ITALY, N° 32. During this time, they extended their conqueſts in that country: but at laſt the Romans, jealous of their progreſs, reſolved to put a ſtop to their victories, and, if poſſible, to drive them quite out. For this purpoſe, they deſigned not only to employ their own force, but entered into alliance with the Franks; which ſo alarmed the Lombards that they re-eſtabliſhed the monarchical form of go-
8 Reſtored. vernment among themſelves, and choſe Autharis the ſon of Clephis for their king. This monarch, conſidering that the power of the dukes, who had governed Lombardy for the ſpace of 10 years, was during that length of time very much eſtabliſhed, and that they would not probably be willing to part with the authority which they had ſo long enjoyed, allowed them to continue in their government; but obliged them to contribute one moiety of their revenues towards the maintenance and ſupport of his royal dignity, ſuffering them to diſpoſe of the other as they thought proper. He reſerved to himſelf the ſupreme dominion and authority; and took an oath of the dukes, that in time of war, they would readily aſſiſt him to the utmoſt of their power. Though he could remove the dukes at pleaſure, yet he deprived none of them of their dukedoms, except in caſes of treaſon; nor gave them to others, except when their male iſſue failed. Having ſettled matters in this manner with the dukes, he enacted ſeveral wholeſome laws againſt theft, rapine, murder, adultery, and other vices which prevailed among his ſubjects, and was the firſt of the Lombard kings who embraced Chriſtianity. Moſt of his ſubjects followed the example of their monarch; but as they were all inſtructed by Arian biſhops, they continued long infected with that hereſy; which occaſioned great diſputes between them and the orthodox biſhops of the cities ſubject to them.

9 Written laws when firſt introduced. From the re-eſtabliſhment of the monarchy under Autharis, to the reign of Rotharis in 636, the hiſtory of the Lombards affords nothing memorable. This period is remarkable for the introduction of written laws among theſe people. Before his time they had been governed only by tradition: but Rotharis, in imitation of the Romans and Goths, undertook the publiſhing of written laws; and to thoſe which he enacted, many were added by the ſucceeding princes. Grotius prefers the method which the Lombards followed in making laws, to that which was practiſed by the Romans themſelves. Among the latter the emperor was the ſole lawgiver; ſo that whatever pleaſed him had the force of a law. But the Lombard kings did not aſſume that power to themſelves, ſince their laws were enacted in public aſſemblies, convened for that purpoſe, after they had been maturely examined and approved of by all the lords of the kingdom. From theſe aſſemblies were excluded the eccleſiaſtic order, and the people: ſo that the legiſlative power was lodged in the king and nobles alone.

The reign of Rotharis is remarkable, not only for his introducing written laws among his ſubjects, but for the conqueſts he made, and the ſucceſsful wars carried on with the exarch of Ravenna, whom he totally defeated in ſeveral engagements, and made himſelf maſter of ſome part of his territories. This monarch died in 652; and the affairs of the Lombards went on proſperouſly, till the ambition of Luitprand laid the foundation of the total ruin of his kingdom. He aſcended the throne of Lombardy in 711, and 10 Luitprand ambition.
watched all opportunities of enlarging his dominions at the expence of the emperor's. Of this, a fair opportunity offered in 716: for the emperor Leo Iſauricus, who at that time reigned in the eaſt, having, by his famous edict, forbidden the worſhip of images, and ordered them to be everywhere pulled down, the people were ſo provoked at that innovation, that, in ſeveral places, they openly revolted, and, falling upon the emperor's officers, drove them out of the cities. In the eaſt, Germanus, patriarch of Conſtantinople, oppoſed the emperor's deſign with great warmth; but Leo cauſed him to be depoſed, and Anaſtaſius to be raiſed to that ſee in his room, ordering at the ſame time all the images in the imperial city to be pulled down and publicly burnt. He ſtrictly enjoined his officers in the weſt, eſpecially the exarch of Ravenna, to ſee his edict punctually obeyed in their reſpective governments. In compliance with theſe orders, Scholaſticus, then exarch, began to pull down the images in all the churches and public places in Ravenna; which incenſed the ſuperſtitious multitude to ſuch a degree, that taking arms, they openly declared they would rather renounce their allegiance to the emperor than the worſhip of images.

Thus a kind of civil war being kindled in the city, Luitprand thought he had now a favourable opportunity of making himſelf maſter of the ſeat of the exarch, not doubting but the conqueſt of ſuch an important place would be followed by that of the whole ex-
11 He beſie and at la takes Ra venna. archate. Having therefore drawn together all his forces, he unexpectedly appeared before Ravenna, and cloſely beſieged it. The exarch little expected ſuch a ſurpriſe, as a friendly correſpondence had been maintained for many years between the exarchs and the Lombard kings. However, he defended the place with ſuch courage and reſolution, that Luitprand, deſpairing of ſucceſs, broke up the ſiege and led his army againſt Claſſis, at a ſmall diſtance from Ravenna, which

which he took, plundered, and levelled with the ground. The loſs of this place, and the ſevere treatment the inhabitants met with from the king, threw the citizens of Ravenna into the utmoſt conſternation; which Luitprand being informed of, he reſolved to take advantage of their fears, and, returning before Ravenna while the inhabitants were thus diſheartened, to attempt once more the reduction of that place. Accordingly he led his whole army againſt it, and, by frequent attacks, tired the inhabitants and garriſon to ſuch a degree, that the exarch, finding they could hold out no longer, and deſpairing of relief, privately withdrew. Luitprand, informed of his retreat, attacked the town with more violence than ever; and, having carried it by ſtorm, gave it to be plundered by his ſoldiers, who found in it an immenſe booty, as it had been for a long time the ſeat of the Roman emperors, of the Gothic kings, and the exarchs. The king ſtripped it of moſt of its valuable monuments of antiquity, and cauſed, among the reſt, an equeſtrian ſtatue of an emperor, of wonderful workmanſhip, to be conveyed to Pavia, where it is to be ſeen to this day. The reduction of Ravenna was followed by the ſurrender of ſeveral cities of the exarchate, which Luitprand reduced to a dukedom; appointing Hildebrand his grandſon to govern it with the title of duke: and giving him, as he was yet an infant, Peredeus duke of Vicenza for his guardian.

12 Reduces he exarchate to a dukedom.

The conqueſt of Ravenna and the greater part of the exarchate did not a little alarm Gregory II. biſhop of Rome. He was then at variance with the emperor, whoſe edict againſt the worſhipping of images he had oppoſed with all his might, and by that means provoked Leo to ſuch a degree, that he had threatened to drive him from the ſee, and ſend him into exile. However, the pope, no leſs jealous of the power of the Lombards than all his predeceſſors had been, reſolved, by ſome means or other, to put a ſtop to their conqueſts. The only prince in Italy to whom he could have recourſe was Urſus duke of Venice, the Venetians making already no inconſiderable figure. To him accordingly he wrote a very preſſing letter; conjuring him to aſſiſt his worthy ſon the exarch, and, for the love of the holy faith, to attempt with him the recovery of the exarchate, which the wicked nation of the Lombards had unjuſtly taken from his ſons Leo and Conſtantine emperors. Urſus and the Venetians, moved with the pope's letter, and at the ſame time greatly alarmed at the growth of ſo powerful a neighbour, promiſed to aſſiſt the exarch with the whole ſtrength of their republic; and accordingly fitted out a conſiderable fleet, pretending it was deſigned for the ſervice of the emperor againſt the Saracens. At the ſame time the exarch, who had taken refuge in Venice, abandoning that place, as it were in deſpair of bringing the duke over to his party, raiſed, in the places ſtill ſubject to the emperor, what forces he was able; and having got together a conſiderable body, he marched with them towards Imola, giving out that he deſigned to beſiege that city; but turning on a ſudden towards Ravenna, as had been agreed on between him and the Venetians, he laid ſiege to it by land, while they inveſted it almoſt at the ſame inſtant by ſea. Peredeus defended the town for ſome time with great courage and reſolution: obliging all thoſe who were able to bear arms to repair to the walls. But the Venetians having, in ſpite of all oppoſition, forced open one of the gates on the ſide of the ſea, the city was taken, and Peredeus ſlain, while he was attempting, at the head of a choice body, to drive the enemy from the poſts they had ſeized. As for Hildebrand, he fell into the hands of the Venetians; who, having thus recovered Ravenna to the emperor, returned home, leaving the exarch in poſſeſſion of the city. Luitprand was then at Pavia; but the town was taken before he could aſſemble his troops to relieve it.

13 The exarch aſſiſted by he Venetians;

14 who retake Ravenna.

And now Gregory biſhop of Rome, to whom the recovery of Ravenna was chiefly owing, perſuading himſelf, that the emperor would, out of gratitude, give ear to his remonſtrances and admonitions, began to ſolicit him with more preſſing letters than ever to revoke his edict againſt the worſhip of images: but Leo, well appriſed that the biſhop, in all the meaſures he had taken, had been more influenced by a regard to his own intereſt than to that of the empire, inſtead of hearkening to his remonſtrances, was ſtill more provoked againſt him for thus obſtinately oppoſing the execution of his edict. Being, therefore, reſolved at all events to have it obſerved in Rome itſelf, and, on the other hand, not doubting but the pope would oppoſe it to the laſt with all his might; in order to remove all obſtacles, he ſent three officers to Rome, with private orders, either to deſpatch the pope, or to take him priſoner and convey him to Conſtantinople. At the ſame time, he wrote to Mauritius duke of Rome, ſecretly enjoining him to aſſiſt his three officers in their undertaking: but no favourable opportunity offering to put their deſign in execution, the emperor, in the year 725, recalled Scholaſticus, and ſent Paul a patrician into Italy, to govern in his room, with private inſtructions to encourage the above-mentioned officers with the promiſe of great rewards, and to aſſure them of his protection.

But, in the mean time, the plot was diſcovered, and two of the conſpirators were apprehended by the citizens of Rome, and put to death; the third having eſcaped into a monaſtery, where he took the monaſtic habit and ended his days. Hereupon the exarch, in compliance with the emperor's orders, reſolved to proceed no longer by ſecret plots, but by open force. Accordingly, he drew together a conſiderable body of troops, and ſet out at the head of them on his march to Rome, with a deſign to ſeize on the pope, and ſend him, as he had engaged to do, in chains to Conſtantinople. But, on this occaſion, Luitprand, though highly provoked againſt Gregory for having ſtirred up the Venetians againſt him, yet reſolved to aſſiſt him and the citizens of Rome againſt the exarch, in order to keep the balance even between them, and by aſſiſting ſometimes the one and ſometimes the other, weaken both. Purſuant to this reſolution, he ordered the Lombards of Tuſcany, and thoſe of the dukedom of Spoletto, to join the pope and the inhabitants of Rome; who, being by this reinforcement far ſuperior in ſtrength and number to the exarch, obliged him to return to Ravenna, and give over all thoughts of any further attempt on the perſon of the pope.

15 Luitprand aſſiſts the pope againſt the exarch.

In the mean time, Leo, perſiſting in his former reſolution of ſuppreſſing throughout his dominions the worſhip of images, ſent freſh orders to the exarch

Paul, ſtrictly enjoining him to cauſe his edict to be put in execution in all the cities of Italy under his empire, eſpecially in Rome. At the ſame time, he wrote to the pope, promiſing him his favour and protection if he complied with the edict; and declaring him, if he continued to oppoſe it, a rebel, and no longer veſted with the papal dignity. But Gregory was ſo far from yielding to the emperor's threats, or promiſes, that, on the contrary, he ſolemnly excommunicated the exarch for attempting to put the imperial edict in execution: and at the ſame time wrote circular letters to the Venetians, to King Luitprand, to the Lombard dukes, and to all the chief cities of the empire, exhorting them to continue ſtedfaſt in the Catholic faith, and to oppoſe with all their might ſuch a deteſtable innovation. Theſe letters made ſuch an impreſſion on the minds of the people in Italy, that though of different intereſts, and often at war with one another, they all united; proteſting they would defend the Catholic faith, and the life of the pope, in ſo glorious a cauſe, at the expence of their own; nay, the citizens of Rome, and the inhabitants of Pentapolis, now Marca d'Ancona, not contenting themſelves with ſuch a proteſtation, openly revolted from the emperor; and, pulling down his ſtatues, they elected, by their own authority, magiſtrates to govern them during the interregnum. We are even told, that, tranſported with a blind zeal, they were for chooſing a new emperor, and conducting him to Conſtantinople, not doubting but the people would everywhere join them. But the pope, thinking this reſolution unſeaſonable, and not to be eaſily put in execution, oppoſed it; ſo that it did not take place.

In the mean time, the exarch Paul, having gained a conſiderable party in Ravenna, began, purſuant to the repeated orders from the emperor, to remove the images, as ſo many idols, out of the churches. Hereupon the adverſe party, ſupported and encouraged by the pope, flew to arms; and, falling upon the *iconoclaſts*, or image-breakers, as they ſtyled them, gave riſe to a civil war within the walls of Ravenna. Great numbers were killed on both ſides: but thoſe who were for the worſhip of images prevailing in the end, a dreadful ſlaughter was made of the oppoſite party; and, among the reſt, the exarch himſelf was murdered. However, the city of Ravenna continued faithful to the emperor; but moſt of the cities of Romagna belonging to the exarchate, and all thoſe of Pentapolis or La Marca d'Ancona, abhorring the emperor as an heretic, ſubmitted to Luitprand king of the Lombards; who, pretending a zeal for the Catholic religion, took care to improve the diſcontent of the people to his advantage, by repreſenting to them, that they could never maintain their religious rights under a prince, who was not only an heretic, but a perſecutor of the orthodox.

16 A civil war at Ravenna.

In Naples, Exhilaratus, duke of that city, having received peremptory orders from the emperor to cauſe his edict to be put in execution, did all that lay in his power to perſuade the people to receive it; but finding all his endeavours thwarted by the biſhop of Rome, for whom the Neapolitans had a great veneration, he hired aſſaſſins to murder him. But the plot being diſcovered, though carried on with great ſecrecy, the Neapolitans, highly provoked againſt the duke, tore both him and his ſon to pieces, and likewiſe put to death one of his chief officers, who had compoſed a libel againſt the pope. Luitprand, and Gregory at that time duke of Benevento, laying hold of ſo favourable an opportunity to make themſelves maſters of the dukedom of Naples, did all that lay in their power to perſuade the Neapolitans to ſubmit to them. But the Neapolitans, bearing an irreconcilable hatred to the Lombards, with whom they had been conſtantly at variance, rejected every overture of that nature with the utmoſt indignation; and, continuing ſtedfaſt in their allegiance to Leo, received from Conſtantinople one Peter, who was ſent to govern them in the room of Exhilaratus. Some writers ſuppoſe the Neapolitans, in this general revolt of the cities of Italy, to have ſhaken off the yoke with the reſt, and to have appointed magiſtrates of their own election to govern them, in the room of the officers hitherto ſent from Conſtantinople, or named by the exarch: but they are certainly miſtaken; it being manifeſt from hiſtory, that Peter ſucceeded Exhilaratus in that dukedom, and that the Neapolitans continued to live under the emperors, till they were conquered many years after by the Normans.

In the mean time, Leo hearing of the murder of the exarch, and the general revolt of the cities, and not doubting but the pope was the chief author of ſo much miſchief, ſent the eunuch Eutychius into Italy, with the title and authority of *exarch*, ſtrictly enjoining him to get the pope deſpatched by ſome means or other, ſince his death was abſolutely neceſſary for the tranquillity of Italy. The exarch ſpared no pains to get the pope into his power: but a meſſenger, whom he had ſent to Rome, being apprehended by the citizens, and an order from the emperor being found upon him to all his officers in that city, commanding them to put the pope to death at all events, the pope's friends thenceforth guarded him with ſuch care, that the exarch's emiſſaries could never afterwards find an opportunity of executing their deſign. As for the meſſenger, the Romans were for putting him to death; but the pope interpoſed, contenting himſelf with excommunicating the exarch.

17 The Romans revolt.

And now the Romans, provoked more than ever againſt Leo, and, on the other hand, unwilling to live under the Lombards, reſolved to revolt from the emperor, and appoint their own magiſtrates, keeping themſelves united under the pope, not yet as their prince, but only as their head. This they did accordingly; and from theſe ſlender beginnings the ſovereignty of the popes in Italy took its riſe, though they did not then, as is commonly ſuppoſed by hiſtorians, but many years after, become ſovereign lords of Rome.

Eutychius failed in his deſign upon the life of the pope; but having brought with him from Conſtantinople a good number of troops, he eaſily quelled the rebellion in Ravenna, and ſeverely puniſhed the authors of the late diſturbances. As for the rebellious Romans, he was well appriſed he could never reduce them, ſo long as they were ſupported by the king of the Lombards; and therefore he employed all his art and policy to take off that prince from the party of the Romans, and bring him over to his own.

Luitprand, for ſome time, withſtood all his offers; but

18 Luitprand concludes an alliance with the exarch.

but Thraſimund duke of Spoletto revolting, at this very juncture, the exarch, laying hold of that opportunity, offered to aſſiſt the king with all his ſtrength againſt the rebellious duke, provided he would, in like manner, aſſiſt him againſt the pope and the Romans. With this propoſal Luitprand readily cloſed; and a league being concluded upon theſe terms between him and the exarch, the two armies joined, and began their march towards Spoletto. At their approach, the duke, deſpairing of being able to reſiſt two ſuch powers, came out with a ſmall attendance to meet them, and, throwing himſelf at the king's feet, ſued, in that humble poſture, for pardon; which Luitprand not only granted him, but confirmed him in the dukedom, after he had obliged him to take a new oath of allegiance, and give hoſtages for his fidelity in time to come. From Spoletto, the two armies marched, in purſuance of the treaty, to Rome; and encamped in the meadows of Nero, between the Tiber and the Vatican.

19 The pope ſubmits to Luitprand.

Gregory had cauſed the city of Rome to be fortified in the beſt manner he could; but being ſenſible that the Romans alone could not long hold out againſt two ſuch armies, and reflecting on the kind treatment the duke of Spoletto had met with upon his ſubmitting to the king, he reſolved to follow his example: and accordingly, taking with him ſome of the clergy, and the principal inhabitants of the city, he went to wait on the king in his camp; and there, with a pathetic ſpeech, as he was a great maſter of eloquence, ſoftened Luitprand to ſuch a degree, that, throwing himſelf at his feet in the preſence of the whole army, he begged pardon for entering into an alliance againſt him: and, aſſuring him of his protection for the future, he went with them to the church of St Peter; and there, diſarming himſelf in the preſence of his chief officers, he laid his girdle, his ſword, and his gauntlet, with his royal mantle, his crown of gold, and croſs of ſilver, on the apoſtle's ſepulchre. After this, he reconciled the pope with the exarch, who was thereupon received into the city, where he continued for ſome time, maintaining a friendly correſpondence with the pope. At this time an impoſtor, taking the name of *Tiberius*, and pretending to be deſcended from the emperors, ſeduced a great many people in Tuſcany, and was by them proclaimed emperor. The exarch, reſolved to march againſt him; but as he had not ſufficient forces to oppoſe the rebels, Gregory, who let no opportunity ſlip of obliging Leo, perſuaded the Romans to attend the exarch in this expedition; by which means the uſurper being taken in a caſtle, his head was ſent to the emperor, and the rebellion utterly ſuppreſſed. But the emperor ſtill inſiſting upon his edict againſt the images being received in Rome, the Romans, at the inſtigation of the pope, publicly renounced their allegiance to Leo, paid him no more tribute, and withdrew for ever their obedience to the emperors of the Eaſt.

20 The emperor ſeizes the dominions of the pope.

Leo, informed of this revolt, and not queſtioning but the pope was the author of it, immediately cauſed all the patrimonies of the church of Rome in Sicily, Calabria, and his other dominions, to be confiſcated. At the ſame time, he ordered a powerful army to be raiſed, with a deſign to recover the towns that had revolted: to chaſtiſe the Romans for their rebellion; and, above all, to be revenged on the pope, who had raiſed all theſe diſturbances, by himſelf oppoſing, and perſuading others to oppoſe, the execution of his edict. Gregory, alarmed at the warlike preparations that were carrying on throughout the empire, and well aporiſed that they were chiefly deſigned againſt him and the Romans, reſolved to recur to the protection of the French, the only nation at that time capable of coping with the emperor, and on whom, on account of their zeal for religion, he thought he might depend. The Lombards were then very powerful; but, as they wanted to be maſters of Rome, he did not think it adviſable to truſt them. The Venetians, though zealous in the defence of the pope, were not yet in a condition to withſtand the power of the emperor; and, beſides, were jealous of the Lombards, who watched all opportunities of enlarging their dominions at the expence of their neighbours. As for Spain, it was then in a moſt deplorable condition, being overrun, and almoſt wholly ruined, by the Saracens.

21 Who applies to the French.

The French nation was at this time governed by the celebrated Charles Martel, who had diſtinguiſhed himſelf in a moſt eminent manner in the wars of France and Germany; and had, not long before, gained a ſignal victory over the Saracens in the neighbourhood of Tours; whence he was generally reputed the beſt commander, and the greateſt hero, of his time. To him, therefore, Gregory ſent a ſolemn embaſſy, with a great number of relics, earneſtly entreating him to take the Romans, and the church, under his protection, and defend them againſt the attempts of Leo. The ambaſſadors were received with extraordinary marks of honour; and a treaty was ſoon concluded between them and Charles, who engaged to march into Italy in perſon, at the head of a powerful army, in defence of the Romans and the church, if they ſhould be attacked either by the emperor or the Lombards. On the other hand, the Romans were to acknowledge him for their protector, and confer on him the honour of the conſulſhip, as it had been formerly conferred on Clovis by the emperor Anaſtaſius, after that prince had defeated the Viſigoths. The ambaſſadors returned from France loaded with rich preſents. But Gregory did not long enjoy the fruit of their negociations; for he died the ſame year 731, and was ſucceeded by Gregory III. in whoſe time ſome place the above-mentioned embaſſy.

22 End of the Lombard kingdom.

The French nation was at this time juſt recovered from its diſtreſſed ſituation under the deſcendants of Clovis; and by the bravery and conduct of Charles Martel, had become the moſt powerful kingdom in the weſt. His ſucceſſor Pepin was no leſs wiſe and powerful than his father had been; and as the ambition of the Lombard princes would be ſatisfied with nothing leſs than the entire conqueſt of Italy, the French monarch, Charlemagne, under colour of aſſiſting the pope, at laſt put an end to the empire of Lombardy, as related under the article FRANCE, N° 21, 22.

23 Character, &c. of the Lombards.

The Lombards were at firſt a cruel and barbarous nation; but diveſting themſelves by degrees of their native fierceneſs and barbarity, eſpecially after they had embraced the Chriſtian religion, they governed with ſuch equity and moderation, that moſt other nations envied the happineſs of thoſe who lived under them. Under the government of the Lombards (ſays Paulus Diaconus) no violence was committed, no one unjuſtly diſpoſſeſſed of his property, none oppreſſed with taxes; theft, robberies, murder, and adultery, were ſeldom heard of: every one went, without the leaſt apprehenſion, wherever he pleaſed. Their laws were ſo juſt and equitable, that they were retained in Italy, and obſerved there ſome ages after their kingdom was at an end.—According to Paulus Diaconus, also, their dreſs was looſe, and for the moſt part of linen, ſuch as the Anglo-Saxons wore, being interwoven with various colours; that their ſhoes were open to the end of their foot, and that they uſed to button or lace them. From ſome ancient paintings, it appears, that they ſhaved the back part of their heads, but that their hair was long before; their locks being parted, and laid on each ſide their foreheads.

LOMBART, or LOMBARD, PETER, an engraver of conſiderable eminence, who flouriſhed about the year 1660. He was a native of Paris, where he learned the art of engraving. It appears that he came to England before the revolution, becauſe ſome of his plates for Engliſh publications are dated prior to that event. He executed a vaſt variety of plates, as well hiſtorical as emblematical; which, however, were chiefly for books. But his beſt works are portraits; and of theſe he produced a conſiderable number, which are eſteemed. They are moſtly after Vandyck.—He alſo engraved hiſtorical ſubjects, from Pouſſin, Raphael, Annibal Carracci, Guido, and other maſters.

LOMENTACEÆ, in *Botany*, (from *lomentum*, a colour uſed by painters), the name of the 33d order in Linnæus's Fragments of a Natural Method, conſiſting of the following genera, many of which furniſh beautiful tinctures that are uſed in dyeing, viz. adenanthera, bauhinia, cæſalpina, caſſia, ceratonia, cercis, gleditſia, guilandina, hæmatoxylon, hymenæa, mimoſa, parkinſonia, poinciana, polygama. See BOTANY.

LOCH-LOMOND, a large lake of Dunbarton or Lennox-ſhire in Scotland, of which Mr Pennant gives the following deſcription. "Loch-Lomond, the laſt, the moſt beautiful of the Caledonian lakes. The firſt view of it from Tarbet preſents an extenſive ſerpentine winding amidſt lofty hills; on the north, barren, black, and rocky, which darken with their ſhade that contracted part of the water. On the weſt ſide, the mountains are clothed near the bottoms with woods of oak quite to the water edge; their ſummits lofty, naked, and craggy. On the eaſt ſide, the mountains are equally high; but the tops form a more even ridge parallel to the lake, except where Ben-Lomond, like Saul amidſt his companions, overtops the reſt. The upper parts were black and barren; the lower had great marks of fertility, or at leaſt of induſtry, for the yellow corn was finely contraſted with the verdure of the groves intermixed with it.

"This eaſtern boundary is part of the Grampian hills, which extend from hence through the counties of Perth, Angus, Mearns, and Aberdeen. The road runs ſometimes through woods; at others is expoſed and naked; in ſome, ſo ſteep as to require the ſupport of a wall; the whole the work of the ſoldiery: bleſſed exchange of inſtruments of deſtruction for thoſe that give ſafety to the traveller, and a poliſh to the once inacceſſible native! Two great headlands covered with trees ſeparate the firſt ſcene from one totally different; the laſt is called the *Point of Firkin*. On paſſing this cape an expanſe of water burſts at once on your eye, varied with all the ſofter beauties of nature. Immediately beneath is a flat covered with wood and corn: beyond, the headlands ſtretch far into the water, and conſiſt of gentle riſings; many have their ſurfaces covered with wood, others adorned with trees looſely ſcattered either over a fine verdure or the purple bloom of the heath. Numbers of iſlands are diſperſed over the lake, of the ſame elevated form as the little capes, and wooded in the ſame manner; others juſt peep above the ſurface, and are tufted with trees; and numbers are ſo diſpoſed as to form magnificent viſtos between.

"Oppoſite Luſs, at a ſmall diſtance from ſhore, is a mountainous iſle almoſt covered with wood; it is near half a mile long, and has a moſt fine effect. I could not count the number of iſlands, but was told there are 28; the largeſt two miles long, and ſtocked with deer.

"The length of this charming lake is 24 miles; its greateſt breadth 8; its greateſt depth, which is between the point of Firkin and Benlomond, is 120 fathoms. Beſides the fiſh common to the lochs are guiniads, called here *poans*.

"The ſurface of Loch-lomond has for ſeveral years paſt been obſerved gradually to increaſe, and invade the adjacent ſhore: and there is reaſon to ſuppoſe that churches, houſes, and other buildings, have been loſt in the water. Near Luſs is a large heap of ſtones at a diſtance from the ſhore, known by the name of the old church; and about a mile to the ſouth of that, in the middle of a large bay, between Camſtraddan and the iſle Inch-tavanack, is another heap, ſaid to have been the ruins of a houſe. To confirm this, it is evident by a paſſage in Camden's Atlas Britannica, that an iſland, exiſting in his time, is now loſt; for he ſpeaks of the iſle of Camſtraddan, placed between the lands of the ſame name and Inch-tavanack, in which, adds he, was an houſe and orchard. Beſides this proof, large trees with their branches ſtill adhering are frequently found in the mud near the ſhore, overwhelmed in former times by the increaſe of water. This is ſuppoſed to be occaſioned by the vaſt quantities of ſtone and gravel that are continually brought down by the mountain rivers, and by the falls of the banks of the Leven; the firſt filling the bed of the lake, the laſt impeding its diſcharge through the bed of the river."

LOMONOZOF, a celebrated Ruſſian poet, the great refiner of his native tongue, was the ſon of a dealer in fiſh at Kolmogori: he was born in 1711, and was fortunately taught to read; a rare circumſtance at that time for a perſon of his ſtation in Ruſſia. His natural genius for poetry was firſt kindled by the peruſal of the Song of Solomon, done into verſe by Polotſki, whoſe rude compoſitions, perhaps ſcarcely ſuperior to our verſion of the pſalms by Sternhold and Hopkins, inſpired him with ſuch an irreſiſtible paſſion for the muſes, that he fled from his father, who was deſirous of compelling him to marry, and took refuge in the Kaikonoſpaſki monaſtery at Moſcow; there he had

Lomonozof. had an opportunity of indulging his taſte for letters, and of ſtudying the Greek and Latin languages. In this ſeminary he made ſo conſiderable progreſs in polite literature, as to be noticed and employed by the Imperial Academy of Sciences. In 1736 he was ſent at the expence of that ſociety, to the univerſity of Marpurg in Heſſe Caſſel, where he became a ſcholar of the celebrated Chriſtian Wolf, under whom he ſtudied univerſal grammar, rhetoric, and philoſophy. He continued at Marpurg four years, during which time he applied himſelf with indefatigable diligence to chemiſtry, which he afterwards purſued with ſtill greater ſucceſs under the famous Henckel at Freyberg in Saxony. In 1741 he returned into Ruſſia; was choſen in 1742 adjunct to the Imperial Academy; and in the enſuing year member of that ſociety and profeſſor of chemiſtry. In 1760 he was appointed inſpector of the ſeminary then annexed to the academy; in 1764 he was gratified by the late empreſs with the title of counſellor of ſtate; and died April 4th that year, in the 54th year of his age. Lomonozof excelled in various kinds of compoſition: but his chief merit, by which he bears the firſt rank among the Ruſſian writers, is derived from his poetical compoſitions, the fineſt of which are his odes. The firſt was written in 1739, while he ſtudied in Germany, upon the taking of Kotſchin, a fortreſs in Crim Tartary, by Marſhal Munich. The odes of Lomonozof are greatly admired for originality of invention, ſublimity of ſentiment, and energy of language; and compenſate for the turgid ſtyle which, in ſome inſtances, has been imputed to them, by that ſpirit and fire which are the principal characteriſtics in this ſpecies of compoſition. Pindar was his great model; and if we may give credit to a perſon well verſed in the Ruſſian tongue, he has ſucceeded in this daring attempt to imitate the Theban bard, without incurring the cenſure of Horace. In this, as well as ſeveral other ſpecies of compoſition, he enriched his native language with various kinds of metre, and ſeems to have merited the appellation beſtowed upon him of the *Father of Ruſſian Poetry*. A brief recapitulation of the principal works of Lomonozof, which were printed in three volumes octavo, will ſerve to ſhow the verſatility of his genius, and his extenſive knowledge in various branches of literature. The firſt volume, beſides a Preface on the advantages derived to the Ruſſian tongue from the eccleſiaſtical writings, contains ten ſacred and nineteen panegyric odes, and ſeveral occaſional pieces of poetry. The ſecond compriſes An Eſſay in Proſe on the Rules for Ruſſian Poetry; Tranſlation of a German Ode; Idylls; Tamira and Selim, a tragedy; Demophoon, a tragedy; Poetical Epiſtle on the Utility of Glaſs; two cantos of an epic poem, entitled, Peter the Great; A Congratulatory Copy of Verſes; An Ode; Tranſlation of Baptiſt Rouſſeau's Ode *Sur le Bonheur;* Heads of a Courſe of Lectures on Natural Philoſophy; certain paſſages tranſlated in verſe and proſe, according to the original, from Cicero, Eraſmus, Lucian, Ælian, Ammianus Marcellinus, Quintus Curtius, Homer, Virgil, Martial, Ovid, Horace, and Seneca, which Ruſſian tranſlations were brought as examples in his Lectures upon Rhetoric; laſtly, Deſcription of the Comet which appeared in 1744. The third volume conſiſts chiefly of Speeches and Treatiſes read before the Academy; Panegyric on the Empreſs Elizabeth; on Peter the Great; Treatiſe on the Advantages of Chemiſtry; on the Phenomena of the Air occaſioned by the Electrical Fire, with a Latin tranſlation of the ſame; on the Origin of Light as a new Theory of Colours; Methods to determine with preciſion the Courſe of a Veſſel; on the origin of Metals by the means of Earthquakes; Latin Diſſertation on Solidity and Fluidity; on the Tranſit of Venus in 1761, with a German tranſlation. Beſides theſe various ſubjects, Lomonozof made no inconſiderable figure in hiſtory, having publiſhed two ſmall works relative to that of his own country. The firſt, ſtyled Annals of the Ruſſian Sovereigns, is a ſhort chronology of the Ruſſian monarchs; and the ſecond is, the Ancient Hiſtory of Ruſſia, from the Origin of that Nation to the Death of the Great Duke Yaroſlaf I. in 1054; a performance of great merit, as it illuſtrates the moſt difficult and obſcure period in the annals of this country.

London. **LONDON**, a large city of Middleſex in England, the metropolis of Great Britain, and one of the moſt wealthy and populous cities in the world, is ſituated on the river Thames, in 51° 31′ north latitude, 400 miles ſouth of Edinburgh, and 270 ſouth-eaſt of Dublin; 180 miles weſt of Amſterdam, 210 north-weſt of Paris, 500 ſouth-weſt of Copenhagen, 600 north-weſt of Vienna, 790 ſouth-weſt of Stockholm, 800 north-eaſt of Madrid, 820 north-weſt of Rome, 850 north-eaſt of Liſbon, 1360 north-weſt of Conſtantinople, and 1414 ſouth-weſt of Moſcow.

This city was by the Romans firſt called *Londinium* or *Lundinum*, as we find it in Tacitus, Ptolemy, Antoninus, and Ammianus. That name was afterwards changed into *Auguſta;* in honour, as ſome ſay, of Helena Auguſta, the mother of Conſtantine the Great; while others think it more probable that it had this name from the ſecond legion, whoſe peculiar title was *Auguſta;* and ſome imagine that the honourable appellation of *Auguſta* was conferred upon this city by the Romans, as upon other principal cities of their empire, on account of its being grown up to be the capital of their Britiſh province. How long the name of *Auguſta* prevailed, is not now certainly known; but after the eſtabliſhment of the Saxons we find no more mention of Auguſta. It was then called *Caer Lundain*, *Lundenn Byrig*, *Lunden Ceaſter*, *Lunden-wyc*, *Lundenne*, *Lunden berh* or *Lundenburg;* ſince the conqueſt the records call it *Londinia*, *Lundonia*, *Londine*, *Londres;* and, for ſeveral ages paſt, it has been called *London*, a manifeſt corruption from Tacitus's *Londinium*. The moſt probable derivation of theſe names appears to be, either from the Britiſh words *lhong*, "a ſhip," and *din*, "a town," i. e. a town or harbour for ſhips; or from *Llin* "a lake," i. e. *Llin din*, "the town upon the lake," the Surry ſide being ſuppoſed, upon very probable grounds, to have been anciently a great expanſe of water. 1 Its different names.

Londinium, however, was not the primitive name of this famous place, which exiſted before the invaſion of the Romans; being, at the time of Cæſar's arrival in the iſland, the capital of the *Trinobantes* or *Trinouantes*. The name of this nation, as appears from Baxter's Britiſh Gloſſary *, was derived from the three following Britiſh words, *tri*, *nou*, *hant*, which ſignify the "inhabitants of the new city." This name, it is When founded.

* P. [illegible]

ſuppoſed, might have been given them by their neighbours, on account of their having newly come from the continent into Britain, and having there founded a city called *tri-now*, or the "new city;" the moſt ancient name of the renowned metropolis of Britain. The Trinobantes had come ſo lately from Belgium, that they ſeem ſcarcely to have been firmly eſtabliſhed in Britain at the time of the firſt Roman invaſion: For their new city, which ſoon after became ſo famous, was then ſo inconſiderable, that it is not mentioned by Cæſar, though he muſt have been within ſight of the place where it was ſituated. His ſilence about this place, indeed, is brought as a proof that he did not croſs the Thames; while Norden by the *firmiſſima civitas* of the Trinobantes underſtands the city in queſtion, the Trinobantes themſelves having been among the firſt of the Britiſh ſtates who ſubmitted to that conqueror.

Henry's Hiſt. vol. i. p. 171.

By Ptolemy, and ſome other ancient writers of good authority, indeed, Londinium is placed in Cantium, or Cent, on the ſouth ſide of the Thames; and it is the opinion of ſome moderns, that the Romans probably had a ſtation there, to ſecure their conqueſts on that ſide of the river, before they reduced the Trinobantes. The place fixed upon for this ſtation is St George's Fields, a large plat of ground ſituated between Lambeth and Southwark, where many Roman coins, bricks, and checquered pavements, have been found. Three Roman ways from Kent, Surry, and Middleſex, interſected each other in this place; this therefore is ſuppoſed to be the original Londinium, which it is thought became neglected after the Romans reduced the Trinobantes, and ſettled on the other ſide of the Thames; and the name was transferred to the new city.

The ſituation of this city, as Mr Pennant obſerves, was juſt ſuch as the people would ſelect according to the rule eſtabliſhed among the Britons. An immenſe foreſt originally extended to the river ſide, and even as late as the reign of Henry II. covered the northern neighbourhood of the city, and was filled with various ſpecies of beaſts of chaſe. It was defended naturally by foſſes; one formed by the creek which run along Fleet-ditch, the other afterwards known by that of Wallbrook; the ſouth ſide was guarded by the Thames; the north they might think ſufficiently protected by the adjacent foreſt.

3
When taken poſſeſſion of by the Romans.

The Romans poſſeſſed themſelves of London, on their ſecond invaſion in the reign of Claudius, about 105 years after their firſt under Cæſar. They had begun with Camelodunum, the preſent Maldon in Eſſex; and having taken it, planted there a colony conſiſting of veterans of the 14th legion. London and Verulam were next taken poſſeſſion of about one and the ſame time. Camelodunum was made a *colonia* or place governed entirely by Roman laws and cuſtoms; Verulam (on the ſite of which St Alban's now ſtands), a *municipium*, in which the natives were honoured with the privileges of Roman citizens, and enjoyed their own laws and conſtitutions; and Londinium only a *præfectura*, the inhabitants, a mixture of Romans and Britons, being ſuffered to enjoy no more than the name of citizens of Rome, being governed by præfects ſent annually from thence, without having either their own laws or magiſtrates. "It was even then of ſuch concourſe (ſays Mr Pennant), and ſuch vaſt trade, that the wiſe conquerors did not think fit to truſt the inhabitants with the ſame privileges as other places of which they had leſs reaſon to be jealous." But others obſerve, that this is a miſtake; and that the Romans, in order to ſecure their conqueſt, and to gain the affections of thoſe Britons who had already ſubmitted to their authority, made London equally a municipium or free city with Verulamium, as may be ſeen by referring to Aulus Gellius, lib. xvi. c. 13. and to Spanhem. orbis Roman. tom ii. p. 37, 38.

4
Ancient commerce of London.

It is difficult to ſay what were the particular articles of commerce exported from and imported into the port of London at this period. The imports and exports of the iſland in general we know: Strabo ſays, "Britain produceth corn, cattle, gold, ſilver, iron; beſides which, ſkins, ſlaves, and dogs, naturally excellent hunters, are exported from that iſland." It is probable that the two firſt and three laſt articles were exported from London; and perhaps, too, the *gagates* or jet-ſtone mentioned by Solinus as one of the productions of Britain, together with horſes, were exported from thence. The imports were at firſt ſalt, earthen ware, and works in braſs, poliſhed bits of bones emulating ivory, horſe collars, toys of amber, glaſſes, and other articles of the ſame material.

In the reign of Nero, as Tacitus informs us, London was become a city highly famous for the great conflux of merchants, her extenſive commerce, and plenty of all things. No fewer than ſeven of the fourteen itinera of Antoninus begin or end at London; which tends to corroborate the many proofs which might be adduced, that this city was the capital of Britain in the Roman times.

5
When firſt ſurrounded with walls.

At firſt London had no walls or other fortifications to defend it, and was therefore expoſed to the attacks of every enemy: and thus it ſuffered ſeverely about the year 64, being burnt by the Britons under Boadicea, and all the inhabitants maſſacred. But it was ſoon reſtored by the Romans; and increaſed ſo much, that in the reign of the emperor Severus it is called by Herodian a *great and wealthy city*. It continued, however, in a defenceleſs ſtate for more than a century after this laſt period; when at laſt a wall of hewn ſtone and Britiſh bricks was erected round it.

London at this time extended in length from Ludgate-hill to a ſpot a little beyond the Tower. The breadth was not half equal to the length, and at each end grew conſiderably narrower. Maitland aſcribes the building of the walls to Theodoſius governor of Britain in 369. Dr Woodward, with more probability, ſuppoſes them to have been founded under the auſpices of Conſtantine the Great; and this ſeems to be confirmed by the numbers of coins of that emperor's mother Helena, which have been diſcovered under them, placed there by him in compliment to her. The ſame emperor made it a biſhop's ſee; for it appears that the biſhops of London and York, and another Engliſh biſhop, were at the council of Arles in the year 314: he alſo ſettled a mint in it, as is plain from ſome of his coins.

6
Their ancient courſe, &c.

The ancient courſe of the wall was as follows: It began with a fort near the preſent ſite of the Tower, was continued along the Minories, and the back of Houndſditch, acroſs Biſhopſgate-ſtreet, in a ſtraight line by London-wall to Cripplegate; then returned ſouthward by Crowder's Well

London.

alley (where several remnants of lofty towers were lately to be seen), to Alderſgate, thence along the back of Bull-and-Mouth-ſtreet to Newgate, and again along the back of the houſes in the Old Bailey to Ludgate; ſoon after which, it probably finiſhed with another fort, where the houſe, late the king's printing-houſe, in Black Friars, now ſtands: from hence another wall ran near the river ſide, along Thames-ſtreet, quite to the fort on the eaſtern extremity. The walls were three miles one hundred and ſixty five feet in circumference, guarded at proper diſtances on the land ſide with fifteen lofty towers; ſome of them were remaining within theſe few years, and poſſibly may ſtill. Maitland mentions one twenty-ſix feet high, near Gravel-lane, on the weſt ſide of Houndſditch; another, about eighty paces ſouth eaſt towards Aldgate; and the baſes of another, ſupporting a modern houſe, at the lower end of the ſtreet called the Vinegar-yard, ſouth of Aldgate. The walls, when perfect, are ſuppoſed to have been twenty-two feet high, the towers forty. Theſe, with the remnants of the wall, proved the Roman ſtructure, by the tiles and diſpoſition of the maſonry. London-wall, near Moorfields, is now the moſt entire part left of that ancient precinct. The gates which received the great military roads, were four. The Prætorian way, the Saxon Watling-ſtreet, paſſed under one, on the ſite of the late Newgate; veſtiges having been diſcovered of the road in digging above Holburn-bridge: it turned down to Dowgate, or more properly Dwr-gate or Water-gate, where there was a trajectus or ferry, to join it to the Watling-ſtreet, which was continued to Dover. The Hermin-ſtreet paſſed under Cripplegate; and a vicinal way went under Aldgate by Bethnal-green, towards Oldford, a paſs over the river Lee to Duroleiton, the modern Leiton in Eſſex.

7 London ſubject to the Saxons.

After the Romans deſerted Britain, a new and fierce race ſucceeded. The Saxons, under their leaders Hengiſt and Horſa, landed in 448, having been invited over by the provincials as auxiliaries againſt the Scots and Picts; but quarrelling with their friends, they found means to eſtabliſh themſelves in the iſland, and in proceſs of time entirely ſubdued them, as related under the article ENGLAND, Nº 31—44. London fell into the hands of thoſe invaders about the year 457; and became the chief city of the Saxon kingdom in Eſſex. It ſuffered much in the wars carried on between the Britons and Saxons: but it ſoon recovered; ſo that Bede calls it a *princely mart-town*, under the government of a chief magiſtrate, whoſe title of *portgrave*, or *portreve*, (for we find him called by both names), conveys a grand idea of the mercantile ſtate of London in thoſe early ages, that required a governor or guardian of the port. During the civil wars of the Saxons with each other, the Londoners had always the addreſs to keep themſelves neuter; and about the year 819, when all the ſeven Saxon kingdoms fell under the power of Egbert, London became the metropolis of England, which it has ever ſince continued.

8 Plundered by the Danes.

During the invaſions of the Danes, London ſuffered greatly. In 849, theſe invaders entered the Thames with 250 ſhips, plundered and burnt the city, and maſſacred the inhabitants; and two years after they returned with a fleet of 350 ſail, fully determined to deſtroy every thing that had eſcaped their ravages in the former expedition. At this time, however, they were diſappointed; moſt of their troops being cut in pieces by King Ethelwolf and his ſon Athelſtan; yet ſuch was the deſtruction made by thoſe barbarians at London, that it ſuffered more from theſe two incurſions than ever it had done before.

9 Recovers under Alfred the Great.

In the reign of King Alfred the Great, London began to recover from its former ruinous ſtate. He rebuilt its walls, drove out the Daniſh inhabitants who had ſettled there, reſtored the city to its former liberties and beauty, and committed the care of it to his ſon-in-law, Ethelred duke of Mercia, in hopes that this might always be a place of ſecure retreat within its ſtrong walls, whatever might happen from a foreign or domeſtic enemy. In 893, however, he had the mortification to ſee his capital totally reduced to aſhes by an accidental fire, which could not be extinguiſhed, as the houſes at that time were all built of wood. The walls, however, being conſtructed of incombuſtible materials, continued to afford the ſame protection as before; the houſes were quickly rebuilt, and the city divided into wards and precincts, for its better order and government. This king alſo inſtituted the office of ſheriff, the nature of which office made it neceſſary to have it alſo in London; ſo that here we have the glimmerings of the order of magiſtrates at preſent ſettled in the city of London: in the perſon of the portreve, or portgrave, or governor of the city, as ſupreme magiſtrate; in the ſheriff, and in the officer or ſubordinate magiſtrate by what name ſoever then diſtinguiſhed, which, being placed at the head of each ward or precinct, were analogous to the more modern title of *aldermen* and *common council men*.

10 Reduced to aſhes.

11 Its government ſettled.

12 Brick and ſtone houſes firſt erected.

Alfred having ſettled the affairs of England in the moſt prudent manner, directed his attention to the ornamenting, as much as poſſible, the city of London. For this purpoſe, he ſpirited up the Engliſh to an emulation in building their houſes of ſtronger and more durable materials than formerly. At that time their houſes were moſtly of wood; and an houſe built of any other materials was looked upon as a kind of wonder. But Alfred having begun to raiſe his palaces of ſtone and brick, the opulent Londoners, and the nobility reſident in and about London, followed the example, though the cuſtom did not come into general uſe till ſome ages after.

13 Beſieged by Canute.

In 1015, a foreign enemy again appeared before London. Canute king of Denmark having invaded and plundered the counties of Dorſet, Somerſet, and Wilts, ſailed up the Thames with 200 ſhips, and laid ſiege to the city. The citizens continued faithful, notwithſtanding the defection of the greateſt part of the kingdom; and made ſuch a brave reſiſtance, that Canute thought fit to withdraw his army, leaving only his fleet to blockade the city by water, that when he found a fair opportunity he might renew the ſiege with better ſucceſs. At laſt, however, being defeated in ſeveral battles by Edmund Ironſide, he was obliged to call off his ſhips to cover his own army in caſe of neceſſity. In the compromiſe, however, which was afterwards made between Edmund and Canute, the city of London was given to the latter, and owned him for its lawful ſovereign. We have a ſtrong proof of the opulence of London even at this time, from the tax laid upon it by Canute in order to pay his army; this being no leſs than 10,500l. while the reſt of the nation was at the ſame time taxed only at 72,000l.

14
Sends repreſentatives to parliament.

In 1046, we have the firſt inſtance of the Londoners ſending repreſentatives to parliament. This happened on ſettling the ſucceſſion to the throne after Canute's death. The Engliſh in general declared for Edward ſon of King Ethelred; or, if that could not be carried, for Hardicanute, ſon of Canute by Queen Emma, and then abſent on a tour to Denmark. The city of London eſpouſed the claim and intereſt of Harold Harefoot, ſon alſo of Canute, by Queen Elgiva of Northampton. Edward's party ſoon declined; and the Londoners agreed, for the peace of the realm, that the two brothers ſhould divide the kingdom between them; but as Hardicanute did not return in proper time to England, a *wittena-gemote* was held at Oxford, where Earl Leofric, and moſt of the thanes on the north of the Thames, with the pilots of London, choſe Harold for their king. Here, by pilots we are to underſtand the directors, magiſtrates, or leading men of the city: and this manifeſtly ſhows, that London was then of ſuch conſequence, that no important national affair was tranſacted without the conſent of the inhabitants; for the Saxon annals aſſure us, that none were admitted into this aſſembly of election but the nobility and the pilots of London.

15
Suffers greatly by fires, hurricanes, &c.

On the invaſion of the Normans under William I. London ſubmitted as well as the reſt of the kingdom; and received two charters from that prince, confirming all the privileges they had under the Saxon kings, and adding ſeveral new ones. But while the citizens were promiſing themſelves all manner of ſecurity and tranquillity under the new government, it was almoſt entirely reduced to aſhes by an accidental fire in 1077. It had ſcarce recovered from this calamity, when it was viſited by another of the ſame kind in 1086, which began at Ludgate and deſtroyed the beſt and moſt opulent part of the city; conſuming, among other buildings, the cathedral of St Paul's; which, however, was ſoon rebuilt more magnificently than before. Under the reign of William Rufus, London ſuffered conſiderably by fires, hurricanes, and inundations, and ſeems to have been depreſſed by the tyranny of that prince; but Henry I. granted large immunities to the city, which again revived its trade, and was favourable to the progreſs of the arts. The king, however, ſtill retained the privilege of appointing the portreve, or chief magiſtrate; but the immunities granted to the Londoners ſecured their affections, and tended much to ſecure him on the throne. At the ſame time, there was ſuch a plenty of all kinds of proviſions, that as much corn was ſold for 1s. as would ſuffice 100 people for a day; 4d. would purchaſe as much hay and corn as would maintain 20 horſes for a day; and a ſheep could be bought for a groat.

16
Monſtrous licentiouſneſs of the Normans.

17
Of the Londoners

Henry thought proper alſo to check the licentious behaviour of the Normans, which, by the favour ſhowed them under the two Williams, had carried them into the moſt barbarous practices. Thoſe who followed William Rufus in his excurſions, haraſſed and plundered the country at diſcretion. Many of them were ſo extravagant in their barbarity, that what they could not eat or drink in their quarters, they either obliged the people to carry to market and ſell for their uſe, or elſe they would throw it into the fire: and, at their going off, they frequently waſhed their horſes heels with the drink, and ſtaved the caſks containing the remainder. King Henry reſolved to put a ſtop to theſe exceſſes and ſavage cuſtoms; and therefore publiſhed a proclamation at London, commanding that thenceforward all perſons who ſhould be convicted of ſuch barbarities ſhould have their eyes pulled out, or their hands or feet cut off, as the miniſters of juſtice ſhould think fit. This effectually checked the inſolence of the Normans, and the city continued to flouriſh throughout the reigns of Henry I. and Stephen. The attachment of the citizens to Stephen, however, was a crime which never could be forgiven by Henry II. and, of conſequence, he made them ſenſible of his diſpleaſure, by making frequent demands of money from them. About this time, indeed, the Londoners were arrived at ſuch a pitch of licentiouſneſs, that their proſperity ſeemed a curſe rather than a bleſſing. The ſons of the moſt eminent and wealthy citizens entered into a confederacy to commit burglaries, and to rob and murder all that came in their way in the nighttime. The king took an opportunity from theſe irregularities to enrich himſelf. He demanded ſeveral loans and free gifts; till at laſt the Londoners, to prevent further inquiries into their conduct, paid into the exchequer 5000l. in three years. Theſe diſorders, however, were at laſt ſtopped by the execution of John Senex; who, though a very rich and reputable citizen, had engaged in theſe enterpriſes. He offered 500lb. weight of ſilver, a prodigious ſum in thoſe days, for his pardon, but was refuſed. The king, however, ſtill continued to drain the citizens of their money by free gifts; and at laſt fined every ſeparate guild, fraternity, or company, that had preſumed to act as bodies corporate without the royal letters-patent.

18
The office of mayor when firſt inſtituted.

On the death of Henry II. the title of the firſt magiſtrate of London was changed from *portgreve* to that of *bailiff;* and in 1189 claimed and acted in the office of the *chief butler* at the coronation of Richard I. In 1191 this monarch permitted the bailiff, named *Henry Fitz-Alwine*, to aſſume the title of *mayor*. For, in 1192, we find certain orders of the mayor and aldermen to prevent fires; whereby it was ordained, that "all houſes thereafter to be erected in London and the liberties thereof, ſhould be built of ſtone, with party-walls of the ſame; and covered either with ſlates or tiles, to prevent thoſe dreadful calamities by fire, which were frequently and chiefly occaſioned by houſes built of wood, and thatched with ſtraw or reeds." And for this purpoſe, it was alſo provided by the diſcreeter men of the city, "that 12 aldermen of the city ſhould be choſen in full huſtings, and there ſworn to aſſiſt the mayor in appeaſing contentions that might ariſe among neighbours in the city upon encloſure betwixt land and land, and to regulate the dimenſions of party-walls, which were to be of ſtone, 16 feet high and three feet thick; and to give directions about girders, windows, gutters, and wells." Such confidence alſo did Richard put in the wiſdom and faithfulneſs of the city of London, that when it was reſolved to fix a ſtandard for weights and meaſures for the whole realm, his majeſty committed the execution thereof to the ſheriffs of London and Middleſex, whom he commanded to provide meaſures, gallons, iron rods, and weights, for ſtandards, to be ſent to the ſeveral counties of England. This happened in 1198, at which time corn was advanced to the enormous price of 18s. 4d. per quarter.

19 Favours granted to the city by King John.

The city of London was much favoured by King John, who granted them three charters ſoon after his acceſſion. The firſt was a recital and confirmation of thoſe granted by Henry I. and II. with the farther privilege of being free from toll and every other duty or cuſtom in his majeſty's foreign dominions; for which they paid the ſum of 3000 merks. The ſecond was a confirmation of one granted by King Richard. By this the citizens of London had the juriſdiction and conſervancy of the river Thames; with a clauſe to extend that juriſdiction, and the powers therewith granted, to the river Medway; and with another clauſe to enable the ſaid city, as conſervators of the rivers Thames and Medway, to inflict a penalty of 10l. upon any perſon that ſhould preſume to erect a wear in either of theſe rivers. The third charter contains a fee-farm-rent of the ſheriffwicks of London and Middleſex at the ancient rent, of which they had been deprived by Queen Maud; granting them alſo the additional power of chooſing their own ſheriffs. This charter was given by way of conveyance from the crown to the citizens for a valuable conſideration, by which the ſheriffwick became their freehold; and this is the firſt covenant or conveyance we find on record with the legal terms of *to have and to hold*, which are at this time accounted an eſſential part in all conveyances of property.

20 London oppreſſed by Henry III.

During the reign of Henry III. the city of London was oppreſſed in many different ways. In 1218, he exacted a fine of 40 marks for ſelling a ſort of cloth not two yards within the liſts; and a 15th of the citizens perſonal eſtates for the enjoyment of their ancient rights and privileges. In 1221, he commanded by proclamation all the foreign merchants to depart the city, which drew 30 marks from the Hanſeatic company of the *Steelyard*, to have ſeiſin of their guild or hall in Thames-ſtreet. But it was the wreſtling match at St Giles's in the fields that brought on their greateſt burden. In the year 1221, on St James's day, the citizens of London having carried off the victory from the people of Weſtminſter and other neighbouring villages, the ſteward of the abbot of Weſtminſter, meditating revenge againſt the Londoners, propoſed another wreſtling match with them, and gave a ram for the prize. The citizens reſorted to the place at the time appointed; but were unexpectedly aſſaulted by a great number of armed men, who killed and wounded many, and diſperſed the reſt. This raiſed a great commotion in the city. The populace breathed revenge; and, by the inſtigation of Conſtantine Fitz-Arnulph, a great favourer of the French party during the troubles in King John's reign, they proceeded to Weſtminſter, and pulled down the houſes both of the ſteward and abbot. Hearing afterwards that the abbot was come into the city with his complaint to Philip d'Aubney the king's counſel, they purſued him, beat his ſervants cruelly, took away 12 of his horſes, and would have murdered himſelf, had he not eſcaped by a back-door. Upon this tumult, Hubert de Bury, then chief juſticiary, ſummoned the mayor and many of the principal citizens to attend him in the tower of London; and inquiring for the authors of the riot, Conſtantine, the ringleader boldly anſwered, that "he was one; that they had done no more than they ought; and that they were reſolved to avow what they had done, let the conſequence be what it would." In this he was ſeconded by his nephew and one Geoffrey: but the juſticiary, having diſmiſſed all the reſt, detained theſe three, and ordered them to be hanged next morning, though Conſtantine offered 15,000 marks for his pardon. Hubert then coming into the city with a ſtrong guard, cauſed the hands and feet of moſt of the principal rioters he could ſeize to be cut off: all which was executed without any legal proceedings or form of trial. After theſe arbitrary cruelties, he degraded the mayor and all the magiſtrates; placed a *cuſtos* over the city, and obliged 30 perſons of his own chooſing to become ſecurities for the good behaviour of the whole city. Several thouſand marks were alſo exacted by the king, before he would conſent to a reconciliation.

This arbitrary conduct alarmed the whole nation. The parliament of 1224 began to be uneaſy for themſelves, and addreſſed his majeſty that he would be pleaſed to confirm the charter of liberties which he had ſworn to obſerve; and the conſequence of this application was a confirmation of the magna charta in the full parliament at Weſtminſter in the year 1225. At this time alſo, the rights and privileges of the citizens were confirmed. They were exempted from proſecution for burels, i. e. liſted cloth; and were granted the right of having a common ſeal. The neceſſitous circumſtances of this monarch, however, made him often exact money arbitrarily as long as he lived.

21 Dreadful plague in 1665.

Under the ſucceeding reigns, as the liberty of the people in general, was augmented, ſo the liberty, opulence, and power of the citizens of London increaſed, until they became a kind of balance to the power of the crown itſelf, which in ſome meaſure they ſtill continue to be. Riots indeed, for which they generally ſuffered, were by no means unfrequent; the city often ſuffered by fires and plagues. Nothing, however, happened which materially affected the welfare of the city, till the reign of Charles II. in 1665.—This year London was ravaged by the moſt violent plague ever known in Britain. The whole ſummer had been remarkably ſtill and warm, ſo that the weather was ſometimes ſuffocating even to people in perfect health; and by this unuſual heat and ſultry atmoſphere, people were undoubtedly prepared for receiving the infection, which appeared with violence in the months of July, Auguſt, and September. A violent plague had raged in Holland in the year 1663; on which account the importation of merchandiſe from that country was prohibited by the Britiſh legiſlature in 1644. Notwithſtanding this prohibition, however, it ſeems the plague had actually been imported; for in the cloſe of the year 1664, two or three perſons died ſuddenly in Weſtminſter, with marks of the plague on their bodies. Some of their neighbours, terrified at the thoughts of their danger, removed into the city; but their removal proved too late for themſelves, and fatal to thoſe among whom they came to reſide. They ſoon died of the plague; and communicated the infection to ſo many others) that it became impoſſible to extinguiſh the ſeeds of it, by ſeparating thoſe that were infected from ſuch as were not. It was confined, however, through a hard froſty winter, till the middle of February, when it again appeared in the pariſh of St Giles's, to which it had been originally brought; and, after another long reſt till April, ſhowed its malignant force afreſh, as ſoon as the warmth of the ſpring gave it opportunity. —At firſt, it took off one here and there, without any certain proof of their having infected each other, and houſes began to be ſhut up, with a deſign to prevent its ſpreading. But it was now too late; the infection gained ground every day, and the ſhutting up of houſes only made the diſeaſe ſpread wider. People, afraid of being ſhut up, and ſequeſtered from all communication with ſociety, concealed their illneſs, or found means to eſcape from their places of confinement; while numbers expired in the greateſt torments, deſtitute of every aſſiſtance; and many died both of the plague and other diſeaſes, who would in all probability have recovered, had they been allowed their liberty, with proper exerciſe and air.—A houſe was ſhut up on account of a maid-ſervant, who had only ſpots, and not the gangrenous plague-blotches, upon her, ſo that her diſtemper was probably a petechial fever. She recovered; but the people of the houſe obtained no liberty to ſtir, either for air or exerciſe, for 40 days. The bad air, fear, anger, and vexation, attending this injurious treatment, caſt the miſtreſs of the family into a fever. The viſitors appointed to ſearch the houſe, ſaid it was the plague, though the phyſicians were of a different opinion: the family, however, were obliged to begin their quarantine anew though it had been almoſt expired before; and this ſecond confinement affected them ſo much, that moſt of the family fell ſick, ſome of one diſtemper and ſome of another. Every illneſs that appeared in the family produced a freſh prolongation of their confinement; till at laſt the plague was actually brought in by ſome of thoſe who came to inquire into the health of the family, and almoſt every perſon in the houſe died.—Many examples of a ſimilar kind happened, and this was one of the worſt conſequences of ſhutting up houſes. All means of putting a ſtop to the infection were evidently ineffectual. Multitudes fled into the country; many merchants, owners of ſhips, &c. ſhut themſelves up, on board their veſſels, being ſupplied with proviſions from Greenwich, Woolwich, and ſingle farm houſes on the Kentiſh ſide. Here, however, they were ſafe; for the infection never reached below Deptford, though the people went frequently on ſhore to the country towns, villages, and farm houſes, to buy freſh proviſions. As the violence of the plague increaſed, the ſhips which had families on board removed farther off; ſome went quite out to ſea, and then put into ſuch harbours and roads as they could beſt get at.

In the mean time, the diſtemper made the moſt rapid advances within the city. In the laſt week of July, the number of burials amounted to 2010; but the firſt week of Auguſt it roſe to 3817; thence to 3880; then to 4237; the next week, to 6102; and at laſt to 7000 and 8000 weekly. In the laſt week of September, however, the fury of the diſeaſe began to abate; though vaſt numbers were ſick, yet the number of burials decreaſed from 7155 to 5538; the next week there was a farther decreaſe to 4929, then to 4327, next to 2665, then to 1421, and the next week to 1031.

All this while, the poor people had been reduced to the greateſt diſtreſſes, by reaſon of the ſtagnation of trade, and the ſickneſſes to which they were peculiarly liable on account of their manner of living. The rich, however, contributed to their ſubſiſtence in a moſt liberal manner. The ſums collected on this occaſion are indeed almoſt incredible; being ſaid to amount to 100,000l. per week. The king is reported to have contributed 1000l. weekly; and in the pariſh of Cripplegate alone, 17,000l. was diſtributed weekly among the poor inhabitants.—By the vigilance alſo of the magiſtrates, proviſions continued remarkably cheap throughout the whole time of this dreadful calamity, ſo that all riots and tumults on that account were prevented; and at laſt, on the ceſſation of the diſeaſe in the winter of 1665, the inhabitants who had fled returned to their habitations, and London to appearance became as populous as ever, though it was computed that 100,000 perſons had been carried off by the plague.

Account of the great fire in 1666.

The city was ſcarcely recovered from the deſolation occaſioned by the plague, when it was almoſt totally laid in aſhes by a moſt dreadful fire. This broke out in a baker's ſhop in Pudding-lane, on Saturday night, September 2. 1666. In a few hours Billingſgate ward was entirely burnt down; and before morning the fire had croſſed Thames-ſtreet, and deſtroyed the church of St Magnus. From thence it proceeded to the bridge, and conſumed a great pile of buildings there; but was ſtopped by the want of any thing more to deſtroy. The flames, however, being ſcattered by a ſtrong eaſt wind, continued their devaſtations in other quarters. All efforts to ſtop it proved unſucceſsful throughout the Sunday. That day it proceeded up as far as Garlick-hithe; and deſtroying Canon-ſtreet, invaded Cornhill and the Exchange. On Monday, the flames having proceeded eaſtward againſt the wind through Thames-ſtreet, invaded Tower-ſtreet, Gracechurch-ſtreet, Fenchurch-ſtreet, Dowgate, Old Fiſh-ſtreet, Watling-ſtreet, Threadneedle-ſtreet, and ſeveral others, from all which it broke at once into Cheapſide. In a few hours Cheapſide was all in flames, the fire having reached it from ſo many places at once. The fire then continuing its courſe from the river on one ſide, and from Cheapſide on the other, ſurrounded the cathedral of St Paul's. This building ſtood by itſelf at ſome diſtance from any houſes; yet ſuch was the violence of the flames, and the heat of the atmoſphere occaſioned by them, that the cathedral took fire at top. The great beams and maſſy ſtones broke through into Faith-church underneath, which was quickly ſet on fire; after which, the flames invaded Pater-noſter-row, Newgate-ſtreet, the Old Bailey, Ludgate-hill, Fleet-ſtreet, Ironmonger-lane, Old-Jewry, Laurence-lane, Milk-ſtreet, Wood-ſtreet, Gutter-lane, Foſter-lane, Lothbury, Cateaton-ſtreet; and, having deſtroyed Chriſt-church, burnt furiouſly through St Martin's le Grand towards Alderſgate.

The fire had now attained its greateſt extent, and was ſeveral miles in compaſs. The vaſt clouds of ſmoke obſcured the ſun ſo, that he either could not be ſeen at all, or appeared through it as red as blood. The flames reached an immenſe way up into the air, and

London.

their reflection from the ſmoke, which in the night-time ſeemed alſo like flame, made the appearance ſtill more terrible. The atmoſphere was illuminated to a great extent, and this illumination is ſaid to have been viſible as far as Jedburgh in Scotland. Some of the light aſhes alſo are ſaid to have been carried to the diſtance of 16 miles. Guildhall exhibited a ſingular appearance. The oak with which it was built was ſo ſolid that it would not flame, but burnt like charcoal, ſo that the building appeared for ſeveral hours like an enchanted palace of gold or burniſhed braſs.

At laſt, on Wedneſday morning, when every one expected that the ſuburbs as well as the city were to have been burnt, the fire began of itſelf to abate by reaſon of the wind having ceaſed, and ſome other changes no doubt taken place in the atmoſphere. It was checked by the great building in Leadenhall-ſtreet, and in other ſtreets by the blowing up ſeveral houſes with gun-powder; and on Thurſday the flames were quite extinguiſhed.—The following is a calculation of the damage done by this extraordinary conflagration.

23
Calculation of the damage done.

Thirteen thouſand two hundred houſes, at 12 years purchaſe, ſuppoſing the rent of each 25l. ſterling,	L. 3,960,000
Eighty-ſeven pariſh churches, at 8000l.	696,000
Six conſecrated chapels, at 2000l.	12,000
The royal exchange - -	50,000
The cuſtomhouſe - -	10,000
Fifty-two halls of companies, at 1500l. each - - -	78,000
Three city gates, at 3000l. each	9000
Jail of Newgate - -	15,000
Four ſtone bridges - -	6000
Seſſions houſe - -	7000
Guildhall, with the courts and offices belonging to it - -	40,000
Blackwell-hall - -	3000
Bridewell - - -	5000
Poultry compter - -	5000
Woodſtreet compter - -	3000
St Paul's church - -	2,000,000
Wares, houſehold ſtuff, money, and removable goods loſt or ſpoiled	2,000,000
Hire of porters, carts, waggons, barges, boats, &c. for removing goods	200,000
Printed books and paper in ſhops and warehouſes - - -	150,000
Wine, tobacco, ſugar, &c. of which the town was at that time very full - - -	1,500,000
	L. 10,689,000

It was never certainly known whether this fire was accidental or deſigned. A ſuſpicion fell upon the Papiſts; and this gained ſuch general credit, that it is aſſerted for a truth on the monument which is erected in memory of the conflagration. Of the truth of this aſſertion, however, though there was not ſufficient proof, it had the effect of making the Papiſts moſt violently ſuſpected and abhorred by the Proteſtants, which ſome time after proved very prejudicial to the city itſelf.

From this calamity, great as it was, London ſoon recovered itſelf, and became much more magnificent than before; the ſtreets, which were formerly crooked and narrow, being now built wide and ſpacious; and the induſtry of its inhabitants repaired the loſſes they had ſuſtained. In 1679, the city was again alarmed by the diſcovery of a deſign to deſtroy it by fire a ſecond time. Elizabeth Oxly, ſervant to one Rind in Fetter-lane, having ſet her maſter's houſe on fire, was apprehended on ſuſpicion, and confeſſed, that ſhe had been hired to do it by one Stubbs a Papiſt, for a reward of 5l. Stubbs being taken into cuſtody, acknowledged that he had perſuaded her to it; and that he himſelf had been prevailed upon by one Father Gifford his confeſſor, who had aſſured him, that by burning the houſes of heretics he would do a great ſervice to the church. He alſo owned that he had ſeveral conferences with Gifford and two Iriſhmen on the affair. The maid and Stubbs alſo agreed in declaring, that the Papiſts intended to riſe in London, expecting to be powerfully ſupported by a French army. In conſequence of this diſcovery, the Papiſts were baniſhed from the city, and five miles round, and five Jeſuits were hanged for the above-mentioned plot.

24
[illegible]

The Papiſts thought to revenge themſelves by forging what was called the *meal-tub plot*, in which the Preſbyterians were ſuppoſed to hatch treacherous deſigns againſt the life of the king. Sir Edmondbury Godfrey alſo, who had been very active in his proceedings againſt the Papiſts, was murdered by ſome unknown perſons; and this murder, together with their diſcovering the falſehood of the meal-tub plot, ſo exaſperated the Londoners, that they reſolved to ſhow their deteſtation of Popery, by an extraordinary exhibition on the 17th of November, Queen Elizabeth's acceſſion to the throne, on which day they had uſually burnt the pope in effigy. The proceſſion began with a perſon on horſeback perſonating Sir Edmondbury Godfrey, attended by a bellman proclaiming his execrable murder. He was followed by a perſon carrying a large ſilver croſs, with prieſts in copes, Carmelites, and Gray-friars, followed by ſix Jeſuits: then proceeded divers waiters, and after them ſome biſhops with lawn ſleeves, and others with copes and mitres. Six cardinals preceded the pope, enthroned in a ſtately pageant, attended by divers boys with pots of incenſe, and the devil whiſpering in his ear. In this order they marched from Biſhopſgate to Fleet-ſtreet; and there, amidſt a great multitude of ſpectators, committed his holineſs to the flames.

25
Which gives occaſion to a conteſt with the court.

This proceſſion gave great offence to the court, at which the duke of York, afterwards James II. had a great influence. The breach was farther widened by the choice of ſheriffs for that year. The candidates ſet up by the court were rejected by a majority of almoſt two to one; but this did not deter their party from demanding a poll in their behalf, upon which a tumult enſued. This was repreſented by the Popiſh party in ſuch colours to the king, that he iſſued out a commiſſion that ſame evening for trying the rioters; which, however, was ſo far from intimidating the reſt, that they grew more and more determined, not only to oppoſe the Popiſh party, but to exclude the duke of York from his ſucceſſion to the crown.

In the mean time, the king prorogued the parliament, to prevent them from proceeding in their inquiry concerning the Popiſh plot, and the excluſion-bill. Upon this the lord-mayor, aldermen, and common-council, preſented a petition to his majeſty, in which they requeſted, that he would permit the parliament to ſit in order to complete their ſalutary meaſures and councils. This petition was highly reſented by the king; who, inſtead of granting it, diſſolved the parliament, and could never afterwards be reconciled to the city. From this time it was determined to ſeize their charter; and freſh provocations having been given about the election of ſheriffs, a *quo warranto* was at laſt produced by the attorney-general, in order to overthrow their charter, and thereby to deprive the citizens of the power to chooſe ſheriffs.

26
A *Quo Warranto* granted againſt the city.

This information ſet forth, That "the mayor and commonalty and citizens of the city of London, by the ſpace of a month then laſt paſt and more, uſed, and yet do claim to have and uſe, without any lawful warrant or legal grant, within the city of London aforeſaid, and the liberties and privileges of the ſame city, the liberties and privileges following, viz. 1. To be of themſelves a body corporate and politic, by the name of *mayor and commonalty and citizens of the city of London.* 2. To have ſheriffs *civitat. et. com. London. et com. Middleſex*, and to name, make, and elect, and conſtitute them. 3. That the mayor and aldermen of the ſaid city ſhould be juſtices of the peace, and hold ſeſſions of the peace. All which liberties, privileges, and franchiſes, the ſaid mayor and commonalty, and citizens of London, upon the king did by the ſpace aforeſaid uſurp, and yet do uſurp."

Though nothing could be more unjuſt than this proſecution, the miniſtry were determined at all events to cruſh the Londoners; rightly judging, that it would be an eaſy matter to make all other corporations ſurrender their charters into the king's hands, and that they had no other body in the nation to fear. Accordingly they diſplaced ſuch judges as would not approve of their proceedings; and, on the 12th of June 1683, Juſtice Jones pronounced the following ſentence: "That a city might forfeit its charter; that the malverſations of the common-council were acts of the whole city; and that the points ſet forth in the pleadings were juſt grounds for the forfeiting of a charter."

Notwithſtanding this ſentence, however, the attorney-general, contrary to the uſual cuſtom in ſuch caſes, was directed to move that the judgement might not be recorded; being afraid of the conſequences. Yet it was judged that the king might ſeize the liberties of the city. A common-council was immediately ſummoned to deliberate on this exigency. The country party moved to have the judgement entered; but they were overruled by the court party, who inſiſted upon an abſolute ſubmiſſion to the king before judgement was entered; and though this was in effect a voluntary ſurrender of the city-liberties, and deprived themſelves of the means of getting the judgement reverſed, the act of ſubmiſſion was carried by a great majority: and in a petition from the lord mayor, aldermen, and common-council, they "acknowledged their own miſgovernment, and his majeſty's lenity; begged his pardon, and promiſed conſtant loyalty and obedience; and humbly begged his majeſty's commands and directions."

27
Conditions of reconciliation between the king and city.

To this his majeſty anſwered, that he would not reject their ſuit, if they would agree upon the following particulars. 1. That no lord mayor, ſheriff, recorder, common ſerjeant, town clerk, or coroner, of the city of London, or ſteward of the borough of Southwark, ſhall be capable of, or admitted to, the exerciſe of their reſpective offices before his majeſty ſhall have approved of them under his ſign-manual. 2. That if his majeſty ſhall diſapprove the choice of any perſon to be lord mayor, and ſignify the ſame under his ſign-manual to the lord mayor, or in default of a lord mayor, to the recorder or ſenior alderman, the citizens ſhall, within one week, proceed to a new choice: and if his majeſty ſhall in like manner diſapprove the ſecond choice, his majeſty may, if he pleaſes, nominate a perſon to be lord mayor for the year enſuing. 3. If his majeſty ſhall, in like manner, diſapprove the perſons choſen to be ſheriffs, or either of them, his majeſty may appoint ſheriffs for the year enſuing. 4. That the lord mayor and court of aldermen may, with the leave of his majeſty, diſplace any alderman, recorder, &c. 5. Upon the election of an alderman, if the court of aldermen ſhall judge and declare the perſon preſented to be unfit, the ward ſhall chooſe again; and upon a diſapproval of a ſecond choice, the court may appoint another in his room. 6. That the juſtices of the peace ſhould be by the king's commiſſion; and the ſettling of thoſe matters to be left to his majeſty's attorney-general and counſel learned in the law."

To theſe the lord-keeper added, in the king's name, "That theſe regulations being made, his majeſty would not only pardon this proſecution, but would confirm their charter in ſuch a manner as ſhould be conſiſtent with them; concluding thus: "My lord mayor, the term draws towards an end, and Midſummer-day is at hand, when ſome of the officers uſed to be choſen; whereof his majeſty will reſerve the approbation. Therefore, it is his majeſty's pleaſure, that you return to the city, and conſult the common-council, that he may ſpeedily know your reſolutions thereupon, and accordingly give his directions. That you may ſee the king is in earneſt, and the matter is not capable of delay, I am commanded to let you know he hath given orders to his attorney-general to enter upon judgement on Saturday next; unleſs you prevent it by your compliance in all theſe particulars."

A common-council was ſummoned, when the friends of liberty treated thoſe ſlaviſh conditions as they deſerved; and even declared, that they were ready to ſacrifice all that was near or dear to them, rather than ſubmit to ſuch arbitrary impoſitions: but when it was put to the vote, there appeared a majority of 18 for ſubmiſſion.

Thus the king got the government of the city into his own hands, though he and his brothers entirely loſt the affections of the Londoners.

28
The king breaks his promiſe.

But, not content with their ſubmiſſion, his majeſty departed from his promiſe; commanded the judgement upon the *quo warranto* to be entered; and commiſſioned Sir William Pritchard, the lord mayor, to hold the ſame office during his majeſty's pleaſure. In the ſame manner he appointed or diſplaced the other magiſtrates as he thought proper;

after which the miniſtry, having nothing to fear, proceeded in the moſt arbitrary manner.

29 Privileges of the city reſtored.

In this ſubjection to the will of the court, the city of London continued till the Revolution; but, in 1689, the immediate reſtoration of the Londoners to their franchiſes was ordered; and in ſuch a manner and form, as to put it out of the powers of an arbitrary miniſtry and a corrupt judge and jury to deprive them of their chartered liberties for the time to come. Accordingly a bill was brought into parliament, and paſſed, for reverſing the judgement of the *quo warranto* againſt the city of London, and for reſtoring the ſame to its ancient rights and privileges. Since that time the city of London hath enjoyed tranquillity; its commerce hath been carried to the higheſt pitch; and for the politeneſs, riches, and number of its inhabitants, as well as is extent and the magnificence of its buildings, is inferior to no city in Europe, if not ſuperior to every one.

30 Deſcription of the city.

That part of this immenſe capital which is diſtinguiſhed by the name of *The City*, ſtands on the north ſhore of the river, from the Tower to the Temple, occupying only that ſpace formerly encompaſſed by the wall, which in circumference meaſures but three miles and 165 feet. In this wall there were ſeven gates by land, viz. Ludgate, Aldgate, Cripplegate, Alderſgate, Moorgate, Biſhopſgate, which were all taken down in September 1760; and Newgate, the county gaol, which was alſo taken down in 1776, and a maſſive building erected a little ſouth of it, which by the rioters in 1780 received damage to the amount of 80,000l. On the ſide of the water there were Dowgate and Billingſgate, long ſince demoliſhed, as well as the poſtern-gate near the Tower. In the year 1670 there was a gate erected called *Temple-Bar*, which terminates the bounds of the city weſtward. The *liberties*, or thoſe parts of this great city which are ſubject to its juriſdiction, and lie without the walls of London, are bounded on the eaſt, in Whitechapel, the Minories, and Biſhopſgate, by bars, which were formerly poſts and chains, that were frequently taken away by arbitrary power, when it was thought proper to ſeize the franchiſes of the city of London: on the north, they are bounded in the ſame manner in Pickaxe-ſtreet, at the end of Fan-alley, and in St John's-ſtreet: on the weſt, by bars in Holborn: at the eaſt end of Middle Row, and at the weſt end of Fleet-ſtreet, by the gate called *Temple-Bar*, already mentioned: on the ſouth, we may include the juriſdiction which the city holds on the river Thames, and over the borough of Southwark.

The city, including the borough, is at preſent divided into 26 wards.

31 Diviſion into wards.

1. *Alderſgate ward* takes its name from a city-gate which lately ſtood in the neighbourhood. It is bounded on the eaſt by Cripplegate ward; on the weſt, by Farringdon ward within and without; and on the ſouth, by Farringdon ward within. It is very large, and is divided into Alderſgate-within and Alderſgate-without. Each of theſe diviſions conſiſts of four precincts, under one alderman, eight common-council men, of whom two are the alderman's deputies, eight conſtables, fourteen inqueſt-men, eight ſcavengers, and a beadle; excluſive of the officers belonging to the liberty of St Martin's le Grand, which contains 168 houſes.

2. *Aldgate* takes its name alſo from a gate, which was of great antiquity, being mentioned in King Edgar's charter to the knights of the Knighton Guild about the year 967; and was probably of a much more ancient foundation, for it was the gate through which the Roman vicinal way lay to the ferry at Oldford. In the time of the wars betwixt King John and his barons, the latter entered the city through this gate, and committed great devaſtations among the houſes of the religious. Aldgate was rebuilt by the leaders of the party after the Roman manner. They made uſe of ſtone which they brought from Caen, and a ſmall brick called the *Flanders tile*, which Mr Pennant thinks has been often miſtaken for Roman. The new gate was very ſtrong, and had a deep well within it. In 1471 this gate was aſſaulted by the Baſtard of Falconbridge, who got poſſeſſion of it for a few hours; but the portcullis being drawn up, the troops which had entered were all cut off, and the citizens, headed by the alderman of the ward and recorder, having made a ſally, defeated the remainder with great ſlaughter. In 1606 Aldgate was taken down and rebuilt; and many Roman coins were found in digging the foundations.—The ward of Aldgate is bounded on the eaſt by the city wall, which divides it from Portſoken ward; on the north, by Biſhopſgate ward; on the weſt, by Lime-ſtreet and Langbourn wards; and on the ſouth, by Tower-ſtreet ward. It is governed by an alderman, ſix common-council men, ſix conſtables, twenty inqueſt-men, ſeven ſcavengers, and a beadle; beſides the officers belonging to St James's, Duke's Place.—It is divided into ſeven precincts.

3. *Baſſiſhaw* or *Baſinghall ward*, is bounded on the eaſt and ſouth by Coleman-ſtreet ward, on the north by part of Cripplegate, and one the weſt by part of the wards of Cheap and Cripplegate. On the ſouth, it begins at Blackwell-hall; and runs northward to London-wall, pulled down ſome time ago to make way for new buildings in *Fore-ſtreet*, and ſpreads 88 feet eaſt, and 54 feet weſt againſt the place where that wall ſtood. This is a very ſmall ward, and conſiſts only of two precincts: the upper precinct contains no more than 66, and the lower only 76 houſes. It is governed by an alderman, four common-council men, of whom one is the alderman's deputy, three conſtables, ſeventeen inqueſt-men, three ſcavengers, and a beadle. It has its name from Baſinghall, the manſion-houſe of the family of *Baſings*, which was the principal houſe in it, and ſtood in the place of Blackwell-hall.

4. *Billingſgate ward* is bounded on the eaſt by Tower-ſtreet ward; on the north, by Langbourn ward; on the weſt, by the ward of Bridge-within; and on the ſouth, by the river Thames. There have been many conjectures concerning the origin of the name of *Billingſgate*, none of which ſeems to be very well authenticated. It is, for inſtance, ſuppoſed to have derived its name from a Britiſh king named *Belinus*, ſaid to have been an aſſiſtant of Brennus king of the Gauls at the taking of Rome, and is the ſame with the *Beli-Maur* mentioned in the Welſh genealogies. The name of *Ludgate* is ſaid to be derived from his ſon

Lud.—It is divided into 12 precincts; and is governed by an alderman, 10 common-council men, one of whom is the alderman's deputy, 11 conſtables, 14 inqueſt-men, ſix ſcavengers, and a beadle. The ſituation of Billingſgate, on the river, gives it great advantages with reſpect to trade and merchandiſe; ſo that it is well inhabited, and is in a continual hurry of buſineſs at the ſeveral wharfs or quays.

5. *Biſhopſgate ward* is bounded on the eaſt by Aldgate ward, Portſoken ward, and part of the Tower-liberty, or Norton-falgate; on the weſt, by Broad-ſtreet ward and Moorfields; and on the ſouth, by Langbourn ward. It is very large, and divided into Biſhopſgate-within and Biſhopſgate-without. The firſt contains all that part of the ward within the city-wall and gate, and is divided into five precincts; the ſecond lies without the wall, and is divided into four precincts. Biſhopſgate-without extends to Shoreditch, taking its name from one Sir John de Sordich, an eminent lawyer much in favour with King Edward III. both on account of his knowledge in the law, and of his perſonal valour. In the time of Henry VIII. one Barlo, a citizen and inhabitant of this place, was named *duke of Shoreditch*, on account of his ſkill in archery; and, for a number of years after, the title belonged to the captain of the London archers. This ward is governed by an alderman, two deputies, one within and the other without, 12 common-council men, ſeven conſtables, 13 inqueſt-men, nine ſcavengers, and two beadles. It took its name from the gate, which has been pulled down to make that part of the city more airy and commodious. This gate was built by Erkenwald biſhop of London in 675; and it is ſaid to have been repaired by William the Conqueror ſoon after the Norman conqueſt. In the time of Henry III. the Hanſe merchants had certain privileges confirmed to them, in return for which they were to ſupport this gate; and in conſequence of this they rebuilt it elegantly in 1479. There were two ſtatues of biſhops, in in memory of the founder and firſt repairer; other two were alſo put up, which are ſuppoſed to have been deſigned for Alfred and Ældred earl of Mercia to whoſe care the gate had been committed.

6. *Bread-ſtreet ward* is encompaſſed on the north and north-weſt, by the ward of Farringdon-within; on the eaſt, by Cordwainers ward; on the ſouth by Queenhithe ward; and on the weſt, by Caſtle-Baynard ward. It is divided into 13 precincts; and is governed by an alderman, 12 common-council men, of whom one is the alderman's deputy, 13 conſtables, 13 inqueſt-men, 13 ſcavengers, and a beadle; and yet contains no more than 331 houſes. It takes its name from the ancient bread-market, which was kept in the place now called *Bread-ſtreet;* the bakers being obliged to ſell their bread only in the open market and not in ſhops.

7. *Bridge-ward within* is bounded on the ſouth by the river Thames and Southwark; on the north, by Langbourn and Biſhopſgate ward; on the eaſt, by Billingſgate; and on the weſt, by Candlewick and Dowgate wards. It is divided into 14 precincts, three of which were on London bridge; and is governed by an alderman, 15 common-council men, one of whom is the alderman's deputy, 14 conſtables, 15 inqueſt-men, 14 ſcavengers, and a beadle. It takes its name from its connexion with London bridge.

8. *Broad-ſtreet ward* is bounded, on the north and eaſt, by Biſhopſgate ward; on the ſouth, by Cornhill and Wallbrook ward; and on the weſt by Coleman-ſtreet ward. It is divided into 10 precincts; and governed by an alderman, 10 common-council men, one of whom is the alderman's deputy, 10 conſtables, 13 inqueſt-men, eight ſcavengers, and a beadle. It has its name from that part of it now diſtinguiſhed by the name of *Old Broad-ſtreet;* and which, before the fire of 1666, was accounted one of the broadeſt ſtreets in London.

9. *Candlewick ward*, *Candlewick-ſtreet*, or *Candlewright-ſtreet ward* as it is called in ſome ancient records, is bounded on the eaſt by Bridge ward; on the ſouth, by Dowgate and part of Bridge ward; on the weſt, by Dowgate and Wallbrook; and on the north, by Langbourn ward. It is but a ſmall ward, conſiſting of about 286 houſes; yet is divided into ſeven precincts. It is governed by an alderman, eight common-council men, of whom one is the alderman's deputy, ſeven conſtables, 13 inqueſt-men, ſeven ſcavengers, and a beadle. It has its name from a ſtreet, formerly inhabited chiefly by candle wrights or candle-makers, both in tallow and wax: a very profitable buſineſs in the times of Popery, when incredible quantities of wax candles were conſumed in the churches. That ſtreet, however, or at leaſt its name, *Candlewick*, is loſt ſince the great conflagration, for which the name *Canon-ſtreet* is ſubſtituted, the candle wrights being at that time burnt out and diſperſed through the city.

10. *Caſtle-Baynard ward* is bounded by Queenhithe and Bread-ſtreet wards on the eaſt; on the ſouth, by the Thames; and on the weſt and north, by the ward of Farringdon-within. It is divided into 10 precincts, under the government of an alderman, 10 common-council men, one of whom is the alderman's deputy, nine conſtables, 14 inqueſt-men, ſeven ſcavengers, and a beadle. It takes its name from a caſtle built on the bank of the river by one Baynard, a ſoldier of fortune, who came in with William the Conqueror, and was by that monarch raiſed to great honours and authority.

11. *Cheap ward* is bounded on the eaſt by Broad-ſtreet and Wallbrook wards; on the north, by Coleman-ſtreet, Baſſiſhaw, and Cripplegate; and on the ſouth, by Cordwainers ward. It is divided into nine precincts; and is governed by an alderman, 12 common-council men, of whom one is the alderman's deputy, 11 conſtables, 13 inqueſt-men, nine ſcavengers, and a beadle. It has its name from the Saxon word *chepe*, which ſignifies a market, kept in this diviſion of the city, now called *Cheapſide:* but then known by the name of *Weſtcheap*, to diſtinguiſh it from the market then alſo kept in Eaſtcheap, between Canon or Candlewick ſtreet and Tower-ſtreet.

12. *Coleman-ſtreet ward* is bounded on the eaſt by Biſhopſgate, Broadſtreet, and Cheap wards; on the north, by Cripplegate ward, Middle Moorfields, and Biſhopſgate; on the ſouth, by Cheap ward; and on the weſt, by Baſſiſhaw ward. It is divided into ſix precincts; and is governed by an alderman, ſix common-

council men, one of whom is the alderman's deputy, ſix conſtables, 13 inqueſt men, ſix ſcavengers, and a beadle. The origin of the name is not certainly known.

13. *Cordwainers ward* is bounded on the eaſt by Wallbrook, on the ſouth by Vintry ward, on the weſt by Bread-ſtreet, and on the north by Cheap ward. It is divided into eight precincts; and is governed by an alderman, eight common-council men, one of whom is the alderman's deputy, eight conſtables, 14 inqueſt-men, eight ſcavengers, and a beadle. Its proper name is *Cordwainers-ſtreet ward;* which it has from Cordwainers-ſtreet, now Bow-lane, formerly occupied chiefly by ſhoemakers and others that dealt or worked in leather.

14. *Cornhill ward* is but of ſmall extent. It is bounded on the eaſt by Biſhopſgate, on the north by Broad-ſtreet, on the weſt by Cheap ward, and on the ſouth by Langbourn ward. It is divided into four precincts, which are governed by one alderman, ſix common-council men, of whom one is the alderman's deputy, four conſtables, 16 inqueſt-men, four ſcavengers, and a beadle. It takes its name from the principal ſtreet in it, known from the earlieſt ages by the name of *Cornhill*, becauſe the corn-market was kept there.

15. *Cripplegate ward* is bounded on the eaſt by Moorfields, Coleman-ſtreet ward, Baſſiſhaw ward, and Cheap ward; on the north by the pariſh of St Luke's, Old-ſtreet; on the weſt, by Alderſgate ward; and on the ſouth, by Cheap ward. It is divided into 13 precincts, nine within and four without the wall; and is governed by an alderman, 12 common-council men, of whom two are the alderman's deputies, 13 conſtables, 34 inqueſt-men, 16 ſcavengers, and three beadles. It takes its name from Cripplegate, which ſtood on the north-weſt part of the city wall. It was an old plain ſtructure, void of all ornament, with one poſtern; but had more the appearance of a fortification than any of the other gates. It was removed in order to widen the entrance into Wood-ſtreet, which, by the narrowneſs of the gateway, was too much contracted and rendered dangerous for paſſengers and great waggons.

16. *Dowgate ward* is bounded on the eaſt by Candlewick and Bridge wards, on the north by Wallbrook ward, on the weſt by Vintry ward, and on the ſouth by the Thames. It is divided into eight precincts, under the government of an alderman, eight common-council men, of whom one is the alderman's deputy, eight conſtables, 15 inqueſt-men, five ſcavengers, and a beadle. It has its name from the ancient water gate, called *Dourgate*, which was made in the original wall that ran along the north ſide of the Thames, for the ſecurity of the city againſt all attempts to invade it by water.

17. *Farringdon ward within* is bounded on the eaſt by Cheap ward and Baynard-caſtle ward; on the north, by Alderſgate and Cripplegate wards, and the liberty of St Martin's le Grand; on the weſt by Farringdon-without; and on the ſouth, by Baynard-caſtle ward, and the river Thames. It is divided into 18 precincts; and governed by one alderman, 17 common-council men, of whom one is the alderman's deputy, 19 conſtables, 17 inqueſt-men, 19 ſcavengers, and two beadles. It takes its name from William Farringdon citizen and goldſmith of London, who, in 1279, purchaſed all the aldermanry with the appurtenances, within the city of London and ſuburbs of the ſame, between Ludgate and Newgate, and alſo *without* theſe gates.

18. *Farringdon ward without* is bounded on the eaſt by *Farringdon within*, the precinct of the late priory of St Bartholomew near Smithfield, and the ward of Alderſgate; on the north, by the Charter-houſe, the pariſh of St John's Clerkenwell, and part of St Andrew's pariſh without the freedom; on the weſt, by High Holborn and St Clement's pariſh in the Strand; and on the ſouth by the river Thames. It is governed by one alderman, 16 common-council men, of whom two are the alderman's deputies, 23 conſtables, 48 inqueſt-men, 24 ſcavengers, and four beadles. It takes its name from the ſame goldſmith who gave name to Farringdon within.

19. *Langbourn ward* is bounded on the eaſt by Aldgate ward; on the north, by part of the ſame, and Lime-ſtreet ward; on the ſouth, by Tower-ſtreet, Billingſgate, Bridge, and Candlewick wards; and on the weſt by Wallbrook. It is divided into 12 precincts. It had its name from a rivulet or long bourn of freſh water, which anciently flowed from a ſpring near Magpye alley adjoining to St Catherine Coleman's church.

20. *Limeſtreet ward* is bounded on the eaſt and north by Aldgate ward, on the weſt by Biſhopſgate; and on the ſouth by Langbourn ward. It is divided into four precincts; and governed by an alderman, four common-council men, one of whom is the alderman's deputy, four conſtables, 13 inqueſt-men, four ſcavengers, and a beadle. It is very ſmall; and has its name from ſome lime-kilns that were formerly built in or near Lime-ſtreet.

21. *Portſoken ward* is bounded on the eaſt by the pariſhes of Spitalfields, Stepney, and St George's in the eaſt; on the ſouth, by Tower-hill; on the north, by Biſhopſgate ward, and on the weſt by Aldgate ward. It is divided into five precincts; and is governed by an alderman, five common-council men, one of whom is the alderman's deputy, five conſtables, 19 inqueſt-men, five ſcavengers, and a beadle. Its name ſignifies the *franchiſe of the liberty gate.* This Portſoken was for ſome time a guild; and had its beginning in King Edgar, when 13 knights, "well beloved of the king and realm, for ſervices by them done," requeſted to have a certain portion of land on the eaſt part of the city left deſolate and forſaken of the inhabitants by reaſon of too much ſervitude. They beſought the king to have this land, with the liberty of a guild for ever. The king granted their requeſt on the following conditions, viz. that each of them ſhould victoriouſly accompliſh three combats, one above the ground, one under ground, and the third in the water: and after this, at a certain day, in Eaſt Smithfield, they ſhould run with ſpears againſt all comers. All this was gloriouſly performed; upon which the king named it *Knighten Guild*, and extended it from Aldgate to the places where the bars now are on the eaſt, and to the Thames on the ſouth, and as far into the water as an horſeman could ride at low water and throw his ſpear.

22. *Queen-hithe ward* is bounded on the eaſt by Dowgate, on the north by Bread-ſtreet and Cord-

London. wainers wards, on the ſouth by the Thames, and on the weſt by Caſtle-Baynard ward. It is divided into nine precincts; and is governed by one alderman, ſix common-council men, one of whom is the alderman's deputy, and nine conſtables. It has its name from the *hithe*, or harbour for large boats, barges, and lighters; for which, and even for ſhips, it was the anchoring place, and the quay for loading and unloading veſſels almoſt of any burden uſed in ancient times. It has the name of *queen*, becauſe the queens of England uſually poſſeſſed the tolls and cuſtoms of veſſels that unloaded goods at this hithe, which were very conſiderable.

23. *Tower ward*, or *Tower-ſtreet ward*, is bounded on the ſouth by the river Thames, on the eaſt by Tower-hill and Aldgate ward, on the north by Langbourn ward, and on the weſt by Billingſgate ward. It is governed by one alderman, 12 common-council men, of whom one is the alderman's deputy, 12 conſtables, 13 inqueſt-men, 12 ſcavengers, and one beadle. It takes its name from *Tower-ſtreet*, ſo called becauſe it leads out of the city in a direct line to the principal entrance of the Tower of London.

24. *Vintry ward* is bounded on the eaſt by Dowgate, on the ſouth by the Thames, on the weſt by Queenhithe ward, and on the north by Cordwainers ward. It is a ſmall ward, containing only 418 houſes; but is divided into nine precincts, and governed by an alderman, nine common-council men, one of whom is the alderman's deputy, nine conſtables, 13 inqueſt-men, three ſcavengers, and a beadle. It takes its name from the vintners or wine-merchants of Bourdeux, who formerly dwelt in this part of the city, were obliged to land their wines on this ſpot, and to ſell them in 40 days, till the 28th of Edward I.

25. *Wallbrook ward* is bounded on the eaſt by Langbourn, on the ſouth by Dowgate ward, on the weſt by Cordwainers ward, and on the north by Cheap ward. It is ſmall, containing only 306 houſes; but is divided into ſeven precincts, and governed by an alderman, eight common-council men, of whom one is the alderman's deputy, ſeven conſtables, 13 inqueſt-men, ſix ſcavengers, and a beadle. It has its name from the rivulet *Wall-brook*, that ran down the ſtreet of this name into the river Thames near Dowgate; but in proceſs of time it was ſo loſt by covering it with bridges, and buildings upon thoſe bridges, that its channel became a common ſewer.

26. The ward of *Bridge-without* includes the borough of Southwark, and the pariſhes of Rotherhithe, Newington, and Lambeth. It has its name from London bridge, with the addition of the word *without*, becauſe the bridge muſt be paſſed in order to come at it. *Weſtminſter* is generally reckoned a part of London, though under a diſtinct government; and has long been famous for the palaces of our kings, the ſeat of our law wribunals, and of the high court of parliament; all which ſhall be deſcribed in their order.

32 Government of London. The city and liberties of London are under an eccleſiaſtical, a civil, and a military government.

33 Eccleſiaſtical. As to its *eccleſiaſtical* government, London is a biſhop's ſee, the dioceſe of which comprehends not only Middleſex, Eſſex, and part of Hertfordſhire, but the Britiſh plantations in America. The biſhop of London takes precedency next to the archbiſhops of Canterbury and York; but the following pariſhes of this city are exempt from his juriſdiction, being peculiars under the immediate government of the archbiſhop of Canterbury; viz. All-hallows in Bread-ſtreet, All-hallows, Lombard-ſtreet; St Dionys Back-church, St Dunſtan in the Eaſt, St John Baptiſt, St Leonard Eaſtcheap, St Mary Aldermary, St Mary Bothaw, St Mary le Bow, St Michael Crooked-lane, St Michael Royal, St Pancras Soper-lane, and St Vedaſt Foſter-lane.

34 Civil. The *civil* government of London divides it into wards and precincts, under a lord mayor, aldermen, and common-council.

35 Lord Mayor. The mayor, or lord mayor, is the ſupreme magiſtrate, choſen annually by the citizens, purſuant to a charter of King John. The preſent manner of electing a lord mayor is by the liverymen of the ſeveral companies, aſſembled in Guildhall annually on Michaelmas-day, according to an act of common council in A. D. 1476, where, and when, the liverymen chooſe, or rather nominate, two aldermen below the chair, who have ſerved the office of ſheriff, to be returned to the court of aldermen, who may chooſe either of the two; but generally declare the ſenior of the two, ſo returned, to be lord mayor elect. The election being over, the lord mayor elect, accompanied by the recorder and divers aldermen, is ſoon after preſented to the lord chancellor (as his majeſty's repreſentative in the city of London) for his approbation; and on the 9th of November following is ſworn into the office of mayor at Guildhall; and on the day after, before the barons of the exchequer at Weſtminſter; the proceſſion on which occaſion is exceedingly grand and magnificent.

The lord mayor ſits every morning at the manſion-houſe, or place where he keeps his mayoralty, to determine any difference that may happen among the citizens, and to do other buſineſs incident to the office of a chief magiſtrate. Once in ſix weeks, or eight times in the year, he ſits as chief judge of oyer and terminer, or gaol-delivery of Newgate for London and the county of Middleſex. His juriſdiction extends all over the city and ſuburbs, except ſome places that are exempt. It extends alſo from Colneyditch, above Staines-bridge in the weſt, to Yeudale, or Yenflete, and the mouth of the river Medway, and up that river to Upnor-caſtle, in the eaſt: by which he exerciſes the power of puniſhing or correcting all perſons that ſhall annoy the ſtreams, banks, or fiſh. For which purpoſe his lordſhip holds ſeveral *courts of conſervancy* in the counties adjacent to the ſaid river, for its conſervation, and for the puniſhment of offenders. See the article MAYOR's-*Court*.

36 Aldermen. The title of dignity, *alderman*, is of Saxon original, and of the greateſt honour, anſwering to that of earl; though now it is nowhere to be found but in chartered ſocieties. And from hence we may account for the reaſon why the aldermen and commonalty of London were called *barons* after the conqueſt. Theſe magiſtrates are properly the ſubordinate governors of their reſpective wards under the lord mayor's juriſdiction; and they originally held their aldermanries either by inheritance or purchaſe; at which time the aldermanries or wards changed their names as often as their governors or aldermen. The oppreſſions, to which the citizens were ſubject from ſuch a government, put them

upon

London. upon means to aboliſh the perpetuity of that office and they brought it to an actual election. But that manner of election being attended with many inconveniences, and becoming a continual bone of contention among the citizens, the parliament, 17 Richard II. A. D. 1394, enacted, that the aldermen of London ſhould continue in their ſeveral offices during life or good behaviour. And ſo it ſtill continues: though the manner of electing has ſeveral times varied. At preſent it is regulated by an act of parliament, paſſed in the year 1724-5: and the perſon ſo elected is to be returned by the lord mayor (or other returning officer in his ſtead, duly qualified to hold a court of wardmote) to the court of lord mayor and aldermen, by whom the perſon ſo returned muſt be admitted and ſworn into the office of alderman before he can act. If the perſon choſen refuſeth to ſerve the office of alderman, he is finable 500l.

Theſe high officers conſtitute a ſecond part of the city legiſlature when aſſembled in a corporate capacity, and exerciſe an executive power in their reſpective wards. The aldermen who have paſſed the chair, or ſerved the high office of lord mayor, are juſtices of the quorum; and all the other aldermen are not only juſtices of the peace, but by the ſtatute of 43 Eliz. entitled, *An act for the relief of the poor*, "every alderman of the city of London, within his ward, ſhall and may do and execute, in every reſpect, ſo much as is appointed and allowed by the ſaid act to be done or executed by one or *two* juſtices of peace of any county within this realm." They every one keep their *wardmote*, or *court*, for chooſing ward-officers and ſettling the affairs of the ward, to redreſs grievances, and to preſent all defaults found within their reſpective wards.

37 Common-council. The next branch of the legiſlative power in this city is the *common-council*. The many inconveniences that attended popular aſſemblies, which were called *folkmote*, determined the commonalty of London to chooſe repreſentatives to act in their name and for their intereſt, with the lord mayor and aldermen, in all affairs relating to the city. At firſt theſe repreſentatives were choſen out of the ſeveral companies: but that not being found ſatisfactory, nor properly the repreſentatives of the whole body of the inhabitants, it was agreed to chooſe a certain number of diſcreet men out of each ward: which number has from time to time increaſed according to the dimenſions of each ward: and at preſent the 25 wards, into which London is divided, being ſubdivided into 236 precincts, each precinct ſends a repreſentative to the common-council, who are elected after the ſame manner as an alderman, only with this difference, that as the lord mayor preſides in the wardmote, and is judge of the poll at the election of an alderman, ſo the alderman of each ward is judge of the poll at the election of a common-council man.

Thus the lord mayor, aldermen, and common-council, when aſſembled, may be deemed the city parliament, reſembling the great council of the nation. For it conſiſts of two houſes; one for the lord mayor and aldermen, or the upper houſe; another for the commoners or repreſentatives of the people, commonly called the *common-council men*. And they have power in their incorporate capacity to make and repeal bye-laws; and the citizens are bound to obey or ſubmit to thoſe laws. When they meet in their incorporate capacity, they wear deep blue ſilk gowns; and their aſſemblies are called the *court of common-council*, and their ordinances *acts of common-council*. No act can be performed in the name of the city of London without their concurrence. But they cannot aſſemble without a ſummons from the lord mayor; who, nevertheleſs, is obliged to call a common-council, whenever it ſhall be demanded, upon extraordinary occaſions, by ſix reputable citizens and members of that court.

38 Sheriffs. This corporation is aſſiſted by two ſheriffs and a recorder. The ſheriffs are chartered officers, to perform certain ſuits and ſervices, in the king's name, within the city of London and county of Middleſex, choſen by the liverymen of the ſeveral companies on Midſummer day. Their office, according to Camden, in general, is to collect the public revenues within their ſeveral juriſdictions; to gather into the exchequer all fines belonging to the crown; to ſerve the king's writs of proceſs; to attend the judges, and execute their orders; to impannel juries; to compel headſtrong and obſtinate men by the *poſſe comitatus* to ſubmit to the deciſions of the law; and to take care that all condemned criminals be duly puniſhed and executed.' In particular, in London, they are to execute the orders of the common-council, when they have reſolved to addreſs his majeſty, or to petition parliament.

The ſheriffs, by virtue of their office, hold a court at Guildhall every Wedneſday and Friday, for actions entered at Wood-ſtreet Compter; and on Thurſdays, and Saturdays for thoſe entered at the Poultry Compter: of which the ſheriffs being judges, each has his aſſiſtant, or deputy, who are called the judges of thoſe courts; before whom are tried actions of debt, treſpaſs, covenant, &c. and where the teſtimony of any abſent witneſs in writing is allowed to be good evidence. To each of theſe courts belong four attornies, who, upon their being admitted by the court of aldermen, have an oath adminiſtered to them.

To each of theſe courts likewiſe belong a ſecondary, a clerk of the papers, a prothonotary, and four clerks-ſitters. The ſecondary's office is to allow and return all writs brought to remove clerks out of the ſaid courts, the clerk of the papers files and copies all declarations upon actions; the prothonotary draws and engroſſes all declarations; the clerk-ſitters enter actions and attachments, and take bail and verdicts. To each of the compters, or priſons belonging to theſe courts, appertain 16 ſerjeants at mace, with a yeoman to each, beſides inferior officers, and the priſon-keeper.

In the ſheriffs court may be tried actions of debt, caſe, treſpaſs, account, covenant, and all perſonal actions, attachments, and ſequeſtrations. When an erroneous judgement is given in either of the ſheriffs courts of the city, the writ of error to reverſe this judgement muſt be brought in the court of huſtings before the lord mayor; for that is the ſuperior court. The ſheriffs of London may make arreſts and ſerve executions on the river Thames.

39 Recorder. We do not read of a recorder till the 1304, who, by the nature of his office, ſeems to have been intended as an aſſiſtant to, or aſſeſſor with, the lord mayor, in the execution of his high office, in matters of juſtice and law. He is choſen by the lord mayor and alder-

men only; and takes place in all courts, and in the common council, before any one that hath not been mayor. Of whom we have the following declaration in one of the books of the chamber: "He ſhall be, as is wont to be, one of the moſt ſkilful and virtuous apprentices of the law of the whole kingdom; whoſe office is always to ſit on the right hand of the mayor, in recording pleas, and paſſing judgements; and by whom records and proceſſes, had before the lord mayor and alderman at Great St Martin's, ought to be recorded by word of mouth before the judges aſſigned there to correct errors. The mayor and aldermen have therefore uſed commonly to ſet forth all other buſineſſes, touching the city, before the king and his council, as alſo in certain of the king's courts, by Mr Recorder, as a chief man, endued with wiſdom, and eminent for eloquence."—Mr Recorder is looked upon to be the mouth of the city, to deliver all addreſſes to the king, &c. from the corporation; and he is the firſt officer in order of precedence that is paid a ſalary, which originally was no more than 10l. ſterling per annum, with ſome few perquiſites; but it has from time to time been augmented to 1000l. per annum, and become the road to preferment in the law. This office has ſometimes been executed by a deputy.

40 Chamberlain.

The next chartered officer of this corporation is the chamberlain; an officer of great repute and truſt, and is in the choice of the livery annually. This officer, though choſen annually on Midſummer day, is never diſplaced during his life, except ſome very great crime can be made out againſt him. He has the keeping of the moneys, lands, and goods, of the city orphans, or takes good ſecurity for the payment thereof when the parties come to age. And to that end he is deemed in the law a ſole corporation, to him and his ſucceſſors, for orphans; and therefore a bond or a recognizance made to him and his ſucceſſors, is recoverable by his ſucceſſors. This officer hath a court peculiarly belonging to him. His office may be termed a public treaſury, collecting the cuſtoms, moneys, and yearly revenues, and all other payments belonging to the corporation of the city. It was cuſtomary for government to appoint the chamberlain receiver of the land tax; but this has been diſcontinued for ſeveral years paſt.

41 Other officers.

The other officers under the lord mayor are, 1. The common ſerjeant. He is to attend the lord mayor and court of aldermen on court days, and to be in council with them on all occaſions, within or without the precincts or liberties of the city. He is to take care of orphans eſtates, either by taking account of them, or to ſign their indentures, before their paſſing the lord mayor and court of aldermen. And likewiſe he is to let, ſet, and manage the orphans eſtates, according to his judgement, to the beſt advantage. 2. The town clerk; who keeps the original charter of the city, the books, rolls, and other records, wherein are regiſtered the acts and proceedings of the city; ſo that he may not be improperly termed the city-regiſter: he is to attend the lord mayor and aldermen at their courts, and ſigns all public inſtruments. 3. The city remembrancer; who is to attend the lord mayor on certain days, his buſineſs being to put his lordſhip in mind of the ſelect days he is to go abroad with the aldermen, &c. He is to attend daily at the parliament houſe, during the ſeſſions, and to report to the lord mayor their tranſactions. 4. The ſword-bearer; who is to attend the lord mayor at his going abroad, and to carry the ſword before him, being the emblem of juſtice. This is an ancient and honourable office, repreſenting the ſtate and princely office of the king's moſt excellent majeſty, in his repreſentative the lord mayor; and, according to the rule of armory, "He muſt carry the ſword upright, the hilts being holden under his bulk, and the blade directly up the midſt of his breaſt, and ſo forth between the ſword-bearer's brows." 5. The common hunt; whoſe buſineſs it is to take care of the pack of hounds belonging to the lord mayor and citizens, and to attend them in hunting in thoſe grounds to which they are authorized by charter. 6. The common crier. It belongs to him and the ſerjeant at arms, to ſummon all executors and adminiſtrators of freemen to appear, and to bring in inventories of the perſonal eſtates of freemen, within two months after their deceaſe: and he is to have notice of the appraiſements. He is alſo to attend the lord mayor on ſet days, and at the courts held weekly by the mayor and aldermen. 7. The water bailiff; whoſe office is to look after the preſervation of the river Thames againſt all encroachments; and to look after the fiſhermen for the preſervation of the young fry, to prevent the deſtroying them by unlawful nets. For that end, there are juries for each county, that hath any part of it lying on the ſides or ſhores of the ſaid river; which juries, ſummoned by the water bailiff at certain times, do make inquiry of all offences relating to the river and the fiſh, and make their preſentments accordingly. He is alſo bound to attend the lord mayor on ſet days in the week.—Theſe ſeven purchaſe their places; except the town clerk, who is choſen by the livery.

There are alſo three ſerjeant carvers; three ſerjeants of the chamber; a ſerjeant of the channel; four yeomen of the water ſide; an under water bailiff; two yeomen of the chamber; two meal weighters; two yeomen of the wood wharfs; a foreign taker; city marſhals. There are beſides theſe, ſeven gentlemen's men; as the ſword-bearer's man, the common hunt's two men, the common crier's man, and the carver's three men.

Nine of the foregoing officers have liveries of the lord mayor, viz. the ſword-bearer and his man, the three carvers, and the four yeomen of the water ſide. All the reſt have liveries from the chamber of London.

The following officers are likewiſe belonging to the city; farmer of the markets, auditor, clerk of the chamber, clerk to the commiſſioners of the ſewers, clerk of the court of conſcience, beadle of the ſame court, clerk of the city works, printer to the city, juſtice of the Bridge yard, clerk comptroller of the Bridge houſe, ſteward of the Borough, bailiff of the Borough.

There is alſo a coroner, called ſo from *corona*, i. e. a *crown*, becauſe he deals principally with the crown, or in matters appertaining to the imperial crown of England. See the article CORONER.

Beſides theſe officers, there are ſeveral courts in this city for the executing of juſtice, viz. the court of huſtings, lord mayor's court, &c. In the city there are

London. alſo two ſubordinate kinds of government. One executed by the alderman, deputy, and common-council men, and their inferior officers, in each ward; under which form are comprehended all the inhabitants, free or not free of the city. Every ward is therefore like a little free ſtate, and at the ſame time ſubject to the lord mayor as chief magiſtrate of the city. The houſekeepers of each ward elect their repreſentatives, the common council, who join in making bye-laws for the government of the city. The officers and ſervants of each ward manage the affairs belonging to it, without the aſſiſtance of the reſt; and each has a court called the *wardmote*, as has been already deſcribed, for the management of its own affairs. The other, by the maſter, wardens, and court of aſſiſtants, of the incorporate companies; whoſe power reaches no farther than over the members of their reſpective guilds or fraternities; except that in them is veſted the power to chooſe repreſentatives in parliament for the city, and all thoſe magiſtrates and officers elected by a common hall; which companies are inveſted with diſtinct powers, according to the tenor of their reſpective charters.

42 Military government. The *military* government of the city is lodged in a lieutenancy, conſiſting of the lord mayor, aldermen, and other principal citizens, who receive their authority by a commiſſion from the king. Thoſe have under their command the city trained bands, conſiſting of ſix regiments of foot, diſtinguiſhed by the names of the *white*, *orange*, *yellow*, *blue*, *green*, and *red*, each containing eight companies of 150 men, amounting in all to 7200. Beſides theſe ſix regiments, there is a corps called the *artillery company*, from its being taught the military exerciſe in the artillery ground. This company is independent of the reſt, and conſiſts of 700 or 800 volunteers. All theſe, with two regiments of foot of 800 men each commanded by the lieutenant of the Tower of London, make the whole militia of this city; which, excluſive of Weſtminſter and the borough of Southwark, amounts to about 10,000 men.

43 Trading Companies. The *trading part* of the city of London is divided into 89 companies; though ſome of them can hardly be called ſo, becauſe they have neither charters, halls, nor liveries. Of theſe 89 companies, 55 have each a hall for tranſacting the buſineſs of the corporation; and this conſiſts of a maſter or prime warden, a court of aſſiſtants, and livery.—Twelve of theſe companies are ſuperior to the reſt both in antiquity and wealth; and of one of thoſe 12 the lord mayors have generally made themſelves free at their election. Theſe companies are the mercers, grocers, drapers, fiſhmongers, goldſmiths, ſkinners, merchant-taylors, haberdaſhers, ſalters, ironmongers, vintners, and clothworkers.—The principal incorporated ſocieties of the merchants of this city are, London. the Hamburgh Company, the Hudſon's Bay Company, the Ruſſia Company, the Turkey Company, the Eaſt India Company, the Royal African Company, the South Sea Company, and ſome Inſurance Companies. The moſt of theſe companies have ſtately houſes for tranſacting their buſineſs, particularly the Eaſt India and South Sea companies. See COMPANY.

44 Remarkable ſtreets and buildings within the City. The ſtreets and public buildings in London and its liberties being far too numerous for a particular deſcription in this work, we ſhall only ſelect the moſt remarkable, beginning with *London Bridge* as the moſt ancient, and proceeding in our ſurvey through the wards into which the city is divided.

45 London Bridge. I. *Remarkable buildings*, &c. *in the* CITY.—The original bridge, which ſtands in Bridge ward, was of wood, and appears to have been firſt built between the years 993 and 1016; but being burnt down about the year 1136, it was rebuilt of wood in 1163. The expences, however, of maintaining and repairing it became ſo burdenſome to the inhabitants of the city, that they reſolved to build a ſtone bridge a little weſtward of the wooden one. This building was begun in 1176, and finiſhed in 1209; and was 915 feet long, 44 feet high, and 73 feet wide; but houſes being built on each ſide, the ſpace between was only 23 feet.

This great work was founded on enormous piles driven as cloſely as poſſible together: on their tops were laid long planks 10 inches thick, ſtrongly bolted; and on them was placed the baſe of the pier, the lowermoſt ſtones of which were bedded in pitch, to prevent the water from damaging the work: round all were the piles which were called the *ſterlings*, deſigned for the preſervation of the foundation piles. Theſe contracted the ſpace between the piers ſo greatly, as to occaſion at the retreat of every tide a fall of five feet, or a number of temporary cataracts, which ſince the foundation of the bridge have occaſioned the loſs of many thouſand lives. The number of arches was 19, of unequal dimenſions, and greatly deformed by the ſterlings and the houſes on each ſide, which overhung and leaned in a moſt terrific name. In moſt places they hid the arches, and nothing appeared but the rude piers. Within recollection, frequent arches of ſtrong timber croſſed the ſtreet from the tops of the houſes to keep them together, and from falling into the river (A). Nothing but uſe could preſerve the quiet of the inmates, who ſoon grew deaf to the noiſe of the falling waters, the clamours of watermen, or the frequent ſhrieks of drowning wretches. In one part had been a drawbridge, uſeful either by way

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(A) The gallant action of Edmund Oſborne, anceſtor to the duke of Leeds, when he was apprentice to Sir William Hewet cloth-worker, may not improperly be mentioned in this place. About the year 1536, when his maſter lived in one of thoſe tremendous houſes, a ſervant maid was playing with his only daughter in her arms in a window over the water, and accidentally dropt the child. Young Oſborne, who was witneſs to the misfortune, inſtantly ſprang into the river, and beyond all expectation, brought her ſafe to the terrified family! Several perſons of rank paid their addreſſes to her when ſhe was marriageable, among others the earl of Shrewſbury; but Sir William gratefully decided in favour of Oſborne: *Oſborne*, ſays he, *ſaved her, and Oſborne ſhall enjoy her.* In her right he poſſeſſed a great fortune. He became ſheriff of London in 1575, and lord mayor in 1582.

of defence or for the admiſſion of ſhips into the upper part of the river. This was protected by a ſtrong tower. It ſerved to repulſe Falconbridge the Baſtard in his general aſſault on the city in 1471, with a ſet of banditti, under pretence of reſcuing the unfortunate Henry, then confined in the Tower. Sixty houſes were burnt on the bridge on the occaſion. It alſo ſerved to check, and in the end annihilate, the ill-conducted inſurrection of Sir Thomas Wyat, in the reign of Queen Mary. The top of this tower, in the ſad and turbulent days of this kingdom, uſed to be the ſhambles of human fleſh, and covered with heads or quarters of unfortunate partizans. Even ſo late as the year 1598, Hentzner, the German traveller, with German accuracy, counted on it above 30 heads. The old map of the city in 1597 repreſents them in a moſt horrible cluſter.—An unparalleled calamity happened on this bridge within four years after it was finiſhed. A fire began on it at the Southwark end; multitudes of people ruſhed out of London to extinguiſh it; while they were engaged in this charitable deſign, the fire ſeized on the oppoſite end, and hemmed in the crowd. Above 3000 perſons periſhed in the flames, or were drowned by overloading the veſſels which were hardy enough to attempt their relief.

The narrowneſs of the paſſage on this bridge having occaſioned the loſs of many lives from the number of carriages continually paſſing; and the ſtraitneſs of the arches, with the enormous ſize of the ſterlings, which occupied one-fourth part of the water-way, having alſo occaſioned frequent and fatal accidents, as already mentioned; the magiſtrates of London in 1756 obtained an act of parliament for improving and widening the paſſage over and through the bridge, which granted them a toll for every carriage and horſe paſſing over it, and for every veſſel with goods paſſing through it: but theſe tolls proving inſufficient, were aboliſhed by an act made in 1758 for explaining, amending, and rendering the former act more effectual; and for granting the city of London money towards carrying on that work. In conſequence of theſe acts of parliament, a temporary wooden bridge was built, and the houſes on the old bridge were taken down. Inſtead of a narrow ſtreet 23 feet wide, there is now a paſſage of 31 feet for carriages, with a raiſed pavement of ſtone on each ſide 7 feet broad for the uſe of foot paſſengers. The ſides are ſecured by ſtone baluſtrades, enlightened in the night with lamps. The paſſage through the bridge is enlarged by throwing the two middle arches into one, and by other alterations and improvements; notwithſtanding which, however, it is ſtill greatly ſubject to its former inconveniences.—Under the firſt, ſecond, and fourth arches, from the north ſide of the bridge, and now likewiſe towards the ſouthern extremities, there are engines worked by the flux and reflux of the river, the water of which they raiſe to ſuch a height as to ſupply many parts of the city. Thoſe engines were contrived in 1582 by one Peter Morice a Dutchman, and are called *London-bridge water-works*. By the report of a committee appointed to conſider of the requiſite improvements in and about London, it was propoſed to remove the preſent London bridge, and to replace it by one of caſt iron 65 feet high in the clear above high water. Part of the plan which came under the conſideration of the committee in 1801, was a deſign of Meſſrs. Telford and Douglas, in which it is propoſed to conſtruct the bridge of a ſingle arch, compoſed wholly of caſt iron; the ſpan of the arch is to be 600 feet, being the width to which, by Mr Jeſſop's report, the river ought to be contracted. The boldneſs and ſimplicity of this deſign render it an object of great attention, not only to the committee engaged in conſidering the further improvement of the port of London, but to the public. No progreſs, we believe, has yet been made in the execution of this plan.

46 The Monument. Near the north ſide of London bridge ſtands the *Monument*, a beautiful and magnificent fluted column of the Doric order, built with Portland ſtone, and erected in memory of the conflagration 1666. It was begun by Sir Chriſtopher Wren in 1671, and finiſhed by him in 1677. Its height from the pavement is 202 feet; the diameter of the ſhaft, or body of the column, is 15 feet; the ground-plinth, or loweſt part of the pedeſtal, is 28 feet ſquare; and the pedeſtal is 40 feet high. Over the capital is an iron balcony encompaſſing a cone 32 feet high, which ſupports a blazing urn of gilt braſs. Within is a large ſtaircaſe of black marble, containing 345 ſteps, each 10 inches and a half broad, and ſix inches thick. The weſt ſide is adorned with a curious emblem in alt-relief, denoting the deſtruction and reſtoration of the city. The firſt female figure repreſents London ſitting in ruins, in a languiſhing poſture, with her head dejected, her hair diſhevelled, and her hand careleſsly lying on her ſword. Behind is *Time*, gradually raiſing her up: at her ſide is a woman touching her with one hand, whilſt a winged ſceptre in the other directs her to regard the goddeſſes in the clouds; one with a cornucopia, denoting *Plenty;* the other with a palm branch, the emblem of *Peace*. At her feet is a bee hive, ſhowing, that by induſtry and application the greateſt misfortunes are to be overcome. Behind the figure of *Time* are citizens exulting at his endeavours to reſtore her; and beneath, in the midſt of the ruins, is a dragon, who, as the ſupporter of the city arms, with his paw endeavours to preſerve the ſame. Oppoſite to the city, on an elevated pavement, ſtands the king, in a Roman habit, with a laurel on his head, and a truncheon in his hand; and approaching her, commands three of his attendants to deſcend to her relief. The firſt repreſents the *Sciences* with a winged head and circle of naked boys dancing thereon; and holding *Nature* in her hand, with her numerous breaſts, ready to give aſſiſtance to all. The ſecond is *Architecture*, with a plan in one hand, and ſquare and a pair of compaſſes in the other; and the third is *Liberty*, waving a hat in the air, ſhowing her joy at the pleaſing proſpect of the city's ſpeedy recovery. Behind the king ſtands his brother the duke of York, with a garland in one hand to crown the riſing city, and a ſword in the other for her defence. The two figures behind are *Juſtice* and *Fortitude;* the former with a coronet, and the latter with a reined lion; and under the royal pavement lies *Envy*, gnawing a heart, and inceſſantly emitting peſtiferous fumes from her month. On the plinth the reconſtruction of the city is repreſented by builders and labourers at work upon houſes. On the north, ſouth, and eaſt ſides, are inſcriptions relating to the deſtruction occaſioned by the conflagration, the regulations about rebuilding the city, and erecting the monument;

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and round it is the following one:—"This pillar was ſet up in perpetual remembrance of the moſt dreadful burning of this Proteſtant city, begun and carried on by the treachery and malice of the Popiſh faction, in the beginning of September, in the year of our Lord 1666, in order to their carrying on their horrid plot for extirpating the Proteſtant religion and old Engliſh liberty, and introducing Popery and ſlavery." Dr Wendeborn, in his account of London, obſerves that the monument, though not much above 100 years old, bears viſible marks of decay already; and it will not probably be long before it muſt be pulled down. Some are of opinion that this is occaſioned by the fault of the architect, others by the continual ſhaking of the ground by coaches; but the doctor inclines to the latter opinion.

47
The Tower.

Eaſtward of the bridge and monument ſtands the *Tower*, which gives name to another ward. It is the chief fortreſs of the city, and ſuppoſed to have been originally built by William the Conqueror. It appears, however, to have been raiſed upon the remains of a more ancient fortreſs, erected probably by the Romans: for in 1720, in digging on the ſouth ſide of what is called *Cæſar's Chapel*, there were diſcovered ſome old foundations of ſtone, three yards broad, and ſo ſtrongly cemented that it was with the utmoſt difficulty they were forced up. The firſt work (according to Mr Pennant) ſeems to have been ſuddenly flung up in 1066 by the Conqueror, on his taking poſſeſſion of the capital; and included in it a part of the ancient wall.

The great ſquare tower, called the *White Tower*, was erected in the year 1078, when it aroſe under the directions of Gundulph biſhop of Rocheſter, who was a great military architect. This building originally ſtood by itſelf. Fitz-Stephen gives it the name of *Arx Palatina*, "the Palatine Tower;" the commander of which had the title of Palatine beſtowed on him. Within this tower is a very ancient chapel for the uſe of ſuch of our kings and queens who wiſhed to pay their devotion here. In 1092 a violent tempeſt did great injury to the Tower; but it was repaired by William Rufus and his ſucceſſor. The firſt added another caſtellated building on the ſouth ſide between it and the Thames, which was afterwards called *St Thomas's Tower*.

The Tower was firſt encloſed by William Longchamp biſhop of Ely and chancellor of England, in the reign of Richard I. This haughty prelate having a quarrel with John, third brother to Richard, under pretence of guarding againſt his deſigns, ſurrounded the whole with walls embattled, and made on the outſide a vaſt ditch, into which, in after times, the water from the Thames was introduced. Different princes added other works. The preſent contents within the walls are 12 acres and 5 rods, the circuit on the outſide of the ditch 1052 feet. It was again encloſed with a mud wall, by Henry III.: this was placed at a farther diſtance from the ditch, and occaſioned the taking down part of the city-wall, which was reſented by the citizens; who, pulling down this precinct of mud, were puniſhed by the king with a fine of a thouſand merks.

London.

The *Lions Tower* was built by Edward IV. It was originally called the *Bulwark*, but received the former name from its uſe. A menagery had very long been a piece of regal ſtate: Henry I. had his at his manor of Woodſtock, where he kept lions, leopards, lynxes, porcupines, and ſeveral other uncommon beaſts. They were afterwards removed to the Tower. Edward II. commanded the ſheriffs of London to pay the keepers of the king's leopards ſixpence a-day for the ſuſtenance of the leopards, and three halfpence a-day for the diet of the keeper out of the fee-farm of the city. The royal menagery is to this day exceedingly well ſupplied.

In 1758 the Tower ditch was railed all round. New barracks were ſome years ago erected on the Tower wharf, which parts it from the river; and upon the wharf is a line of 61 pieces of cannon, which are fired upon ſtate holidays. On this ſide of the Tower the ditch is narrow, and over it is a drawbridge. Parallel to the wharf, within the walls, is a platform 70 yards in length, called the *Ladies Line*, becauſe much frequented by the ladies in the ſummer; it being ſhaded in the inſide with a row of lofty treees, and without is a delightful proſpect of the ſhipping with boats paſſing and repaſſing on the river Thames. You aſcend this line by ſtone ſteps, and being once upon it you may walk almoſt round the walls of the Tower without interruption.

The principal entrance into the Tower is by a gate to the weſt, large enough to admit coaches and heavy carriages; but theſe are firſt admitted through an outward gate, ſituated without the ditch upon the hill, and muſt paſs a ſtout ſtone bridge built over the ditch before they can approach the main entrance. There is, beſides, an entrance near the very ſouth-weſt corner of the Tower outward wall, for perſons on foot, over the drawbridge already mentioned to the wharf. There is alſo a water-gate, commonly called *Traitor's gate*, through which it has been cuſtomary to convey traitors and other ſtate priſoners to or from the Tower, and which is ſeldom opened on any other occaſion; but the lords committed to the Tower in 1746 were publicly admitted at the main entrance. Over this gate is a regular building, terminated at each end by two round towers, on which are embraſures for pointing cannon. In this building there are the infirmary, the mill, and the water-works that ſupply the Tower with water.

In the Tower, the curioſities of which are more particularly deſcribed in the note (B), are a church, the offices of ordnance and of the mint, thoſe of the keepers

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(B) In examining the curioſities of the Tower of London, it will be proper to begin with thoſe on the outſide of the principal gate. The firſt thing a ſtranger uſually goes to viſit is the wild beaſts; which, from their ſituation, firſt preſent themſelves: for having entered the outer gate, and paſſed what is called the ſpur-guard, the keeper's houſe preſents itſelf before you, which is known by a painted lion on the wall, and another over keepers of the records, of the jewel office, of the Spaniſh armoury, the horſe armoury, and the new or ſmall armoury; with barracks for the ſoldiers of the garriſon, and handſome houſes for ſeveral officers who reſide here. The principal officers of the Tower are, a conſtable, a lieutenant, and a deputy-lieutenant. Belonging to this fortreſs are 11 hamlets; the militia of which, conſiſting of 400 men, are obliged, at the command of the conſtable of the Tower, to repair hither, and reinforce the garriſon.

45 Victualling Office.

On Little Tower-hill is the *Victualling office* for the navy. It is ſeparated from Towerhill by a wall and gate, and contains houſes for the officers, ſlaughter-houſes, ſtorerooms, a brewhouſe, a ſalting-houſe, and barrelling-houſe; under the direction of ſeven commiſſioners and other inferior officers.

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over the door which leads to their dens. By ringing a bell, and paying ſixpence each perſon, you may eaſily gain admittance.

The next place worthy of obſervation is the Mint, which comprehends near one-third of the Tower, and contains houſes for all the officers belonging to the coinage. On paſſing the principal gate you ſee the White Tower, built by William the Conqueror. This is a large, ſquare, irregular ſtone building, ſituated almoſt in the centre, no one ſide anſwering to another, nor any of its watch-towers, of which there are four at the top, built alike. One of theſe towers is now converted into an obſervatory. In the firſt ſtory are two noble rooms, one of which is a ſmall armoury for the ſea-ſervice, it having various ſorts of arms, very curiouſly laid up, for above 10,000 ſeamen. In the other room are many cloſets and preſſes, all filled with warlike engines and inſtruments of death. Over this are two other floors, one principally filled with arms; the other with arms and other warlike inſtruments, as ſpades, ſhovels, pickaxes, and chevaux de frize. In the upper ſtory are kept match, ſheep ſkins, tanned hides, &c. and in a little room called Julius Cæſar's chapel, are depoſited ſome records, containing perhaps the ancient uſages and cuſtoms of the place. In this building are alſo preſerved the models of the new-invented engines of deſtruction that have from time to time been preſented to the government. Near the ſouth-weſt angle of the White Tower is the Spaniſh armoury, in which are depoſited the ſpoils of what was vainly called the Invincible Armada; in order to perpetuate to lateſt poſterity the memory of that ſignal victory obtained by the Engliſh over the whole naval power of Spain in the reign of Philip II.

You are now come to the grand ſtorehouſe, a noble building to the northward of the White Tower, that extends 245 feet in length and 60 in breadth. It was begun by King James II. who built it to the firſt floor; but it was finiſhed by King William III. who erected that magnificent room called the New or Small Armoury, in which that prince, with Queen Mary his conſort, dined in great form, having all the warrant workmen and labourers to attend them, dreſſed in white gloves and aprons, the uſual badges of the order of maſonry. To this noble room you are led by a folding door, adjoining to the eaſt end of the Tower chapel, which leads to a grand ſtaircaſe of 50 eaſy ſteps. On the left ſide of the uppermoſt landing-place is the work-ſhop, in which are conſtantly employed about 14 furbiſhers, in cleaning, repairing, and new-placing the arms. On entering the armoury, you ſee what they call a wilderneſs of arms, ſo artfully diſpoſed, that at one view you behold arms for near 80,000 men, all bright and fit for ſervice; a ſight which it is impoſſible to behold without aſtoniſhment; and beſide thoſe expoſed to view, there were, before the late war, 16 cheſts ſhut up, each cheſt holding about 1000 muſkets. The arms were originally diſpoſed by Mr Harris, who contrived to place them in this beautiful order, both here and in the guard-chamber of Hampton-court. He was a common gunſmith; but after he had performed this work, which is the admiration of people of all nations, he was allowed a penſion from the crown for his ingenuity.

Upon the ground floor, under the ſmall armoury, is a large room of equal dimenſions with that, ſupported by 20 pillars, all hung round with implements of war. This room, which is 24 feet high, has a paſſage in the middle 16 feet wide. At the ſight of ſuch a variety of the moſt dreadful engines of deſtruction, before whoſe thunder the moſt ſuperb edifices, the nobleſt works of art, and numbers of the human ſpecies, fall together in one common and undiſtinguiſhed ruin; one cannot help wiſhing that thoſe horrible inventions had ſtill lain, like a falſe conception, in the womb of nature, never to have been ripened into birth.

The horſe armoury is a plain brick building, a little to the eaſtward of the White Tower; and is an edifice rather convenient than elegant, where the ſpectator is entertained with a repreſentation of thoſe kings and heroes of our own nation, with whoſe gallant actions it is to be ſuppoſed he is well acquainted; ſome of them equipped and ſitting on horſeback, in the ſame bright and ſhining armour they were uſed to wear when they performed thoſe glorious actions which gave them a diſtinguiſhed place in the Britiſh annals.

You now come to the line of kings, which your conductor begins by reverſing the order of chronology; ſo that in following them we muſt place the laſt firſt.

In a dark, ſtrong ſtone room, about 20 yards to the eaſtward of the grand ſtorehouſe, or new armoury, the crown jewels are depoſited. 1. The imperial crown, with which it is pretended that all the kings of England have been crowned ſince Edward the Confeſſor in 1042. It is of gold, enriched with diamonds, rubies, emeralds, ſapphires, and pearls: the cap within is of purple velvet, lined with white taffety, turned up with three rows of ermine. They are, however, miſtaken in ſhowing this as the ancient imperial diadem of St Edward; for that, with the other moſt ancient regalia of this kingdom, was kept in the arched room in the cloiſters in Weſtminſter Abbey till the civil war: when, in 1642, Harry Martin, by order of the parliament, broke open the iron cheſt in which it was ſecured, took it thence, and ſold it, together with the

robes,

49 Cuſtomhouſe.

In Tower ward is alſo the *Cuſtomhouſe*, a large, handſome, and commodious building of brick and ſtone. It ſtands upon the bank of the Thames, and is accommodated with large wharfs, keys, and warehouſes. On this ſpot is the buſy concourſe of all nations, who pay their tribute towards the ſupport of Great Britain. About the year 1559, the loſs to the revenue, by collecting it in different parts of the city, was firſt diſcovered, and an act paſſed to compel people to land their goods in ſuch places as were appointed by the commiſſioners of the revenue; and this was the ſpot fixed on: A cuſtomhouſe was erected; which, being deſtroyed by the great fire, was rebuilt by Charles II. In 1718 it underwent the ſame fate, and was reſtored in its preſent form. Before the cuſtomhouſe was eſtabliſhed here, the principal place for receiving the duties was at Billingſgate. In 1268 the half year's cuſtoms for foreign merchandiſe in the city of London came

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robes, ſword, and ſceptre, of St Edward. However, after the Reſtoration, King Charles II. had one made in imitation of it, which is that now ſhown. 2. The golden orb, or globe, put into the king's right hand before he is crowned: and borne in his left hand, with the ſceptre in his right, upon his return into Weſtminſter-hall after he is crowned. It is about ſix inches in diameter, edged with pearl, and enriched with precious ſtones. On the top is an amethyſt, of a violet colour, near an inch and a half in height, ſet with a rich croſs of gold, adorned with diamonds, pearls, and precious ſtones. The whole height of the ball and cup is 11 inches. 3. The golden ſceptre, with its croſs ſet upon a large amethyſt of great value, garniſhed round with table diamonds. The handle of the ſceptre is plain, but the pummel is ſet round with rubies, emeralds, and ſmall diamonds. The top riſes into a *fleur de lis* of ſix leaves, all enriched with precious ſtones, from whence iſſues a mound or ball, made of the amethyſt already mentioned. The croſs is quite covered with precious ſtones. 4. The ſceptre, with the dove, the emblem of peace, perched on the top of a ſmall Jeruſalem croſs, finely ornamented with table diamonds and jewels of great value. This emblem was firſt uſed by Edward the Confeſſor, as appears by his ſeal; but the ancient ſceptre and dove was ſold with the reſt of the regalia, and this now in the Tower was made after the Reſtoration. 5. St Edward's ſtaff, four feet ſeven inches and a half in length, and three inches three quarters in circumference, all of beaten gold, which is carried before the king at his coronation. 6. The rich crown of ſtate, worn by his majeſty in parliament; in which is a large emerald ſeven inches round; a pearl eſteemed the fineſt in the world; and a ruby of ineſtimable value. 7. The crown belonging to his royal highneſs the prince of Wales. The king wears his crown on his head when he ſits upon the throne; but that of the prince of Wales is placed before him, to ſhow that he is not yet come to it. 8. The late Queen Mary's crown, globe, and ſceptre, with the diadem ſhe wore at her coronation with her conſort King William III. 9. An ivory ſceptre, with a dove on the top, made for King James II.'s queen, whoſe garniture is gold, and the dove on the top gold enamelled with white. 10. The *curtana*, or ſword of mercy, which has a blade of 32 inches long, and near two broad, is without a point, and is borne naked before the king at his coronation, between the two ſwords of juſtice, ſpiritual and temporal. 11. The golden ſpurs, and the armillas, which are bracelets for the wriſts. Theſe, though very antique, are worn at the coronation. 12. The *ampulla*, or eagle of gold, finely engraved, which holds the holy oil the kings and queens of England are anointed with; and the golden ſpoon that the biſhop pours the oil into. Theſe are two pieces of great antiquity. The golden eagle, including the pedeſtal, is about nine inches high, and the wings expand about ſeven inches. The whole weighs about ten ounces. The head of the eagle ſcrews off about the middle of the neck, which is made hollow for holding the holy oil; and when the king is anointed by the biſhop, the oil is poured into the ſpoon out of the bird's bill. 13. A rich ſaltſeller of ſtate, in form like the ſquare White Tower, and ſo exquiſitely wrought, that the workmanſhip of modern times is in no degree equal to it. It is of gold, and uſed only on the king's table at the coronation. 14. A noble ſilver font, double gilt, and elegantly wrought, in which the royal family are chriſtened. 15. A large ſilver fountain preſented to King Charles II. by the town of Plymouth, very curiouſly wrought; but much inferior in beauty to the above. Beſides theſe, which are commonly ſhown, there are in the jewel office all the crown jewels worn by the princes and princeſſes at coronations, and a great variety of curious old plate.

The record office conſiſts of three rooms, one above another, and a large round room, where the rolls are kept. Theſe are all handſomely wainſcotted, the wainſcot being framed into preſſes round each room, within which are ſhelves and repoſitories for the records; and for the eaſier finding of them, the year of each reign is inſcribed on the inſide of theſe preſſes, and the records placed accordingly. Within theſe preſſes, which amount to 56 in number, are depoſited all the rolls, from the firſt year of the reign of King John to the beginning of the reign of Richard III. but thoſe after this laſt period are kept in the Rolls Chapel. The records in the Tower, among other things, contain the foundation of abbeys and other religious houſes; the ancient tenures of all the lands in England, with a ſurvey of the manors; the original of laws and ſtatutes; proceedings of the courts of common law and equity; the rights of England to the dominion of the Britiſh ſeas; leagues and treaties with foreign princes: the achievements of England in foreign wars; the ſettlement of Ireland, as to law and dominion; the forms of ſubmiſſion of ſome Scottiſh kings for territories held in England; ancient grants of our kings to their ſubjects; privileges and immunities granted to cities and corporations during the period above mentioned; enrolments of charters and deeds made before the conqueſt; the bounds of all the foreſts in England, with the ſeveral reſpective rights of the inhabitants to common paſture, and many other important records, all regularly digeſted, and referred to in near a thouſand folio indexes. This office is kept open, and attendance conſtantly given, from ſeven o'clock till one, except in the months of December, January, and February, when it is open only from eight to one, Sundays and holidays excepted. A ſearch here is half a guinea, for which you may peruſe any one ſubject a year.

came only to 75l. 6s. 10d.; the annual produce of the cuſtoms, ending in April 1789, amounted to 3,711,126l.

50 Trinity Houſe. In Water-lane, a little to the north-weſt of the cuſtomhouſe, is the *Trinity Houſe;* a ſociety founded in 1515, at a period in which the Britiſh navy began to aſſume a ſyſtem. The founder was Sir Thomas Spert, comptroller of the navy, and commander of the great ſhip Henry Grace de Dieu. It is a corporation, conſiſting of a maſter, four wardens, eight aſſiſtants, and eighteen elder brethren; ſelected from commanders in the navy and the merchants ſervice; and now and then a compliment is paid to one or two of our firſt nobility. They may be conſidered as guardians of our ſhips, military and commercial. Their powers are very extenſive: they examine the mathematical children of Chriſt's hoſpital, and the maſters of his majeſty's ſhips; they appoint pilots for the river Thames; ſettle the general rates of pilotage; erect light houſes and ſea marks; grant licenſes to poor ſeamen, not free of the city, to row on the Thames; prevent foreigners from ſerving on board our ſhips without licenſe; puniſh ſeamen for mutiny and deſertion; hear and determine complaints of officers and men in the merchants ſervice, but liable to appeal to the judge of the court of admiralty; ſuperintend the deepening and cleanſing of the river Thames, and have under their juriſdiction the ballaſt office; have powers to buy lands, and receive donations for charitable uſes; and in conſequence, relieve annually many thouſands of poor ſeamen, their widows, and orphans. It is in this houſe the buſineſs of the inſtitution is carried on: but the mother houſe is at Deptford, the corporation being named, "the maſter, wardens, and aſſiſtants of the guild or fraternity of the moſt glorious and undivided Trinity, and of St Clement, in the pariſh of Deptford Strond, in the county of Kent."

51 The Minories. Between Aldgate and the Tower is the ſtreet called the *Minories*, from ſome poor ladies of the order of St Clare, or minoreſſes. They had been invited to London by Blanch queen of Navarre, and wife to Edmund earl of Lancaſter, who founded a convent for them in 1293. On the ſuppreſſion of the monaſteries it was converted into a dwelling houſe for ſome of the nobility, and is now in the poſſeſſion of the Dartmouth family. Till of late years, the Minories were but a deſpicable ſtreet; but have now been excellently rebuilt, and are as elegant as any in the city.

On the weſt ſide of the city walls at this place, ſtood the houſe of the *Crutched* or *Croſſed Friars*, an order inſtituted at Bologna in 1169, and of which a branch ſettled in England in 1244, where they were accommodated with a houſe in this place by two citizens named *Ralph Hoſier* and *William Sabernes*, who became members of their order. Henry VIII. granted their houſe to Sir Thomas Wyat the elder, who built a handſome manſion on part of the ground where it ſtood. This manſion became afterwards the reſidence of John Lord Lumley, a celebrated warrior in the time of Henry VIII. In proceſs of time, it was converted into a navy office: but this office being removed to Somerſet-houſe, the India Company have erected in its place a moſt magnificent warehouſe, in form of an oblong ſquare of about 250 feet by 160, encloſing a court of 150 by 60 feet, the entrance to which is by an arched gateway.

52 India Company's warehouſe.

53 Billingſgate. Billingſgate ward is diſtinguiſhed by its *market*. *Billingſgate* was a ſmall port for the reception of ſhipping, and for a conſiderable time the moſt important place for the landing of almoſt every article of commerce. In the time of King William, Billingſgate began to be celebrated as a fiſh-market. In 1699 it was by act of parliament made a free port for fiſh to be ſold there every day except Sunday; but Mr Pennant informs us, that the object of this has long been fruſtrated, and that fiſh are now no longer to be had there in perfection. The ſame author gives a liſt of the fiſh which in the time of Edward III. were brought to the London market; the monarch himſelf having condeſcended to regulate the prices, that his ſubjects might not be impoſed upon by thoſe who ſold them. Among theſe were the conger-eel and porpoiſe, neither of which is now admitted to any table. A pike at that time coſt 6s. 8d.; whence our author concludes, that it was an exotic fiſh, and brought over at a vaſt expence. Some fiſhes are mentioned in his liſt with which this naturaliſt owns himſelf unacquainted, viz. the *barkey*, *bran*, *batrile*, *cropling*, and *rumb*. In Archbiſhop Nevill's great feaſt is mentioned alſo a fiſh named *thirle-poole*, unknown at preſent. Seals were formerly accounted a fiſh; and theſe, together with the ſturgeon and porpoiſe, were the only freſh fiſh permitted by the 33d of Henry VIII. to be bought of any ſtranger at ſea between England, France, Flanders, and Zealand.

54 Leadenhall. Limeſtreet ward is remarkable for a very large building of great antiquity, called *Leadenhall*, with flat battlements leaded on the top, and a ſpacious ſquare in the middle. In 1309 it was the houſe of Sir Hugh Nevill, knight; in 1384, of Humphry Bohun earl of Hereford; in 1408 it became the property of the celebrated Whittington, who preſented it to the mayor and commonalty of London; and in 1419, a public granary was erected here by Sir Simon Eyre, a citizen and draper, who built it with ſtone in its preſent form. This granary was deſigned as a preſervative againſt famine, and to be kept always full of corn, which deſign was for ſome time happily anſwered. The houſe came to be uſed for many other purpoſes beſides that of a granary; as for keeping the artillery and arms of the city. Preparations for any kind of pageantry or triumph were alſo made here; and from its ſtrength the place was conſidered as the chief fortreſs within the city in caſe of any popular inſurrection, and was likewiſe the place from whence alms were diſtributed. In this edifice are warehouſes for the ſale of leather, Colcheſter baize, meal, and wool. Adjoining to Leadenhall is a market, thence called *Leadenhall market*, conſiſting of five conſiderable ſquares or courts, and reckoned one of the greateſt markets in Europe for fleſh and other proviſions, as well as for leather, green hides, and wool. A little to the eaſtward is the *India Houſe*, built in 1726, on the ſpot occupied by Sir William Craven, mayor in 1610. According to Mr Pennant, this houſe "is not worthy of the lords of Indoſtan." 55 The India Houſe.

56 Bank of England. In Broad-ſtreet is the *Bank of England*, a ſtone building, which occupies one ſide of Threadneedle-ſtreet. The centre, and the building behind, were founded

finished in the year 1734; the architect George Sampson. Before that time the business was transacted in Grocers-hall. The front is a [illegible] of [illegible]; the [illegible], the ornamental columns above both. Within is a court leading to a second elegant building, which contains a hall and offices, where the debt of above 200 millions is gradually discharged. Of late years two wings of uncommon elegance, designed by Sir Robert Taylor, have been added, at the expence of a few houses, and of the church of St Christopher's le Stocks. "The name of the projector of this national glory (says Mr Pennant), was Mr James Paterson of Scotland. This palladium of our country was in 1780 saved from the fury of an infamous banditti by the virtue of its citizens, who formed suddenly a volunteer company, and overawed the miscreants; while the chief magistrate ſkulked trembling in his manſion-houſe, and left his important charge to its fate. This important building has ever ſince been very properly guarded by the military; who, in paſſing through the city, have often given offence to many busy characters who would ſtrive to preſerve the city rights at the expence of the national deſtruction. A lord mayor was the laſt who intereſted himſelf by applying to Mr Grenville, who gave him to underſtand, that if the guards were not quietly permitted to diſcharge their duty, the bank would be removed to Somerſet-houſe."

57 Merchant-Taylors Hall, &c. At the extremity of Threadneedle-ſtreet is *Merchant-Taylors Hall*. In this ſtreet alſo is the *South Sea House*, firſt eſtabliſhed in 1711 for the purpoſe of an excluſive trade to the South ſea, and for ſupplying Spaniſh America with negroes.

Near the junction of Throgmorton-ſtreet with Broad-ſtreet ſtood a magnificent houſe built by Cromwell earl of Eſſex; after whoſe fall, the houſe and gardens were bought by the Drapers company. The houſe was deſtroyed in the great fire, but rebuilt for the uſe of the company in a magnificent manner.

58 St Giles's. Mr Pennant informs us, that *St Giles's church* in the fields, and a few houſes to the weſt of it, in the year 1600, were barely ſeparated from Broad-ſtreet. The church is ſuppoſed to have belonged to an hoſpital for lepers, founded about the year 1117, by Matilda queen to Henry I. In ancient times it was cuſtomary here to preſent the malefactors, on their way to the gallows (which, about the year 1413, was removed from Smithfield, and placed between St Giles's high-ſtreet and Hog-lane (c), a great bowl of ale, as the laſt refreſhment they were to receive in this life. On the door to the churchyard is a curious piece of ſculpture, repreſenting the laſt day, containing an amazing number of figures, ſet up about the year 1687. This church was [illegible]. By the [illegible] riſing of the ground by dirt and various adventitious matter, the floor in the year 1730 was eight feet below the ſurface acquired in the intervening time. This alone made it neceſſary to rebuild the church in the preſent century. The firſt ſtone was laid in 1730; it was finiſhed in 1734, at the expence of [illegible].—In the churchyard is a great ſquare pit, with many rows of coffins piled one upon the other, all expoſed to ſight and ſmell, the latter of which is highly offenſive if not dangerous.

On the weſt ſide of Broad ſtreet ſtood the houſe of the Auguſtines, founded by Humphrey Bohun earl of Somerſet in 1253, for friars and hermits of the Auguſtine order. On the diſſolution of the monaſtery, great part of the houſe was granted to William Lord St John, afterwards marquis of Wincheſter, and lord treaſurer, who founded a magnificent houſe named *Wincheſter-houſe*. The weſt end of the church was granted in 1551 to John a Laſco for the uſe of the Germans and other fugitive Proteſtants, and afterwards to the Dutch as a place for preaching. A part of it was alſo converted into a glaſs-houſe for Venice glaſs, in which the manufacture was carried on by artiſts from that city, and patroniſed by the duke of Buckingham. The place was afterwards converted into *Pinners-hall*, belonging to the company of pinmakers. 59 Wincheſter House.

60 Greſham College. To the eaſtward of Wincheſter-ſtreet ſtood the houſe of that very eminent merchant Sir Thomas Greſham, afterwards known by the name of *Greſham college*: (See GRESHAM.) It has been pulled down not many years ago; and the *Exciſe Office*, a moſt magnificent and at the ſame time ſimple building, roſe in its place. Mr Pennant informs us, that from the 5th of January 1786 to January 5th 1787, the payments into this office amounted to no leſs than 5,531,114l. 6s. 10½d. 61 Exciſe Office.

62 Royal Exchange. The *Royal Exchange*, which is the meeting place of the merchants of London, ſtands in the ward of Cornhill, and is the fineſt and ſtrongeſt fabric of the kind in Europe. It was founded in the year 1566. Sir Thomas Greſham merchant in London, made an offer to the lord mayor and citizens, to build, at his own expence, a commodious edifice for merchants to meet and tranſact buſineſs, provided the city would find him a convenient ſituation for the ſame. Mr Pennant informs us, that one Richard Clough a Welſhman, originally Sir Thomas's ſervant, firſt put him on this deſign by a letter from Antwerp, in which he reproached the London merchants with having no place to tranſact their buſineſs, but walking about in the rain, more like pedlars than merchants. The citizens, in compliance with Sir Thomas's deſire, pur-

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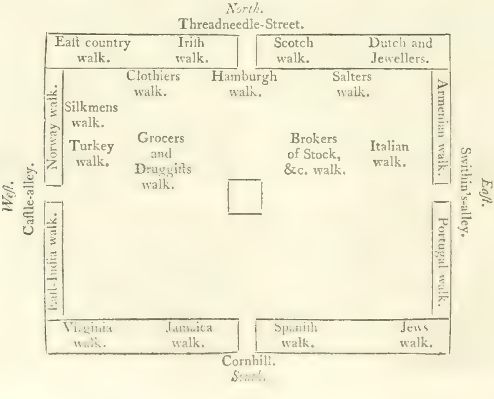
(c) This late place of execution, according to Mr Pennant, was called in the time of Edward III. when the gentle Mortimer finiſhed his days here, *the Elms*: but the original as well as the preſent name was *Tybourne*; not from *tye* and *burn*, as if it were called ſo from the manner of capital puniſhments; but from *bourne*, the Saxon word for a "brook," and *Tye* the name of that brook, which joined gave name to a manor before the conqueſt. Here was alſo a village and church denominated *St John the Evangeliſt*, which fell to decay, and was ſucceeded by that of *Mary-bourne*, corrupted into *Mary-la-bonne*. In 1626, Queen Henrietta Maria was compelled by her prieſts to take a walk by way of penance to Tyburn. What her offence was we are not told; but Charles was ſo diſguſted at this inſolence, that he ſoon after ſent them and all her majeſty's French ſervants out of the kingdom.

chaſed, for the ſum of 3532l. So houſes in the two alleys called *New St Chriſtopher's* and *Swan-alley*, leading out of Cornhill into Threadneedle-ſtreet. The materials of thoſe houſes were ſold for 478l. and the ground, when cleared, was conveyed to Sir Thomas Greſham, who, accompanied by ſeveral aldermen, laid the firſt brick of the new building on the 7th of June that year. Each alderman alſo laid his brick, and left a piece of gold for the workmen; who ſet about it with ſuch aſſiduity and reſolution, that the whole fabric was roofed by the month of November 1567, and was ſoon after completed under the name of the *Burſe*. This building was totally deſtroyed by the fire in 1666; and in its place the preſent magnificent ſtructure was erected at the expence of 80,000l. which ſtands upon a plat of ground 203 feet in length and 171 in breath, containing an area in the middle, of 61 ſquare perches, ſurrounded with a ſubſtantial and regular ſtone building, wrought in ruſtic. It has two fronts, north and ſouth, each of which is a piazza; and in the centre are the grand entrances into the area, under a very lofty and noble arch. The ſouth front in Cornhill is the principal; on each ſide of which are Corinthian demi-columns, ſupporting a compaſs pediment; and, in the intercolumniation on each ſide, in the front next the ſtreet, is a niche, with the ſtatues of King Charles I. and II. in Roman habits, and well executed. Over the aperture, on the cornice between the two pediments, are the king's arms in relievo; on each ſide of this entrance is a range of windows placed between demi-columns and pilaſters of the compoſite order, above which runs a baluſtrade. This building is 56 feet high; and from the centre, in this front, riſes a lanthorn and turret 178 feet high, on the top of which is a vane of gilt braſs made in the ſhape of a graſhopper, the creſt of Sir Thomas Greſham's arms. The north front in Threadneedle-ſtreet is adorned with pilaſters of the compoſite order; but has neither columns nor ſtatues on the outſide; and has triangular, inſtead of compaſs, pediments. The inſide of the area is alſo ſurrounded with piazzas, forming ambulatories for merchants, &c. to ſhelter themſelves from the weather, when met there upon buſineſs. Above the arches of this piazza is an entablature with curious ornaments: and on the cornice a range of pilaſters with an entablature extending round, and a compaſs pediment in the middle of the cornice of each of the four ſides. Under the pediment on the north ſide are the king's arms; on the ſouth, the city's arms; on the eaſt, Sir Thomas Greſham's arms; and on the weſt, the mercers arms, with their reſpective enrichments. In theſe intercolumns are 24 niches, 20 of which are filled with the ſtatues of the kings and queens of England. Under theſe piazzas, within the area, are 28 niches, all vacant but that in which Sir Thomas Greſham's ſtatue is placed in the north-weſt angle, and that in the ſouth-weſt, where the ſtatue of Sir John Barnard was placed in his lifetime by his fellow-citizens to expreſs their ſenſe of his merit. The centre of this area alſo is ornamented with a ſtatue of King Charles II. in a Roman habit, ſtanding upon a marble pedeſtal about eight feet high, and encompaſſed with iron rails; which pedeſtal is enriched on the ſouth ſide with an imperial crown, a ſceptre, ſword, palm-branches, and other decorations, with a very flattering inſcription to the king. On the weſt ſide is a Cupid cut in relievo, reſting his right hand on a ſhield, with the arms of France and England quartered, and holding a roſe in his left hand. On the north ſide is another Cupid ſupporting a ſhield, with the arms of Ireland; and on the eaſt ſide are the arms of Scotland, with a Cupid holding a thiſtle; all done in relievo: the whole executed by that able ſtatuary Mr Gibbon.

In this area, merchants, and ſuch as have buſineſs with them, meet every day at change hours; and for the more regular and readier deſpatch of buſineſs, they diſpoſe of themſelves into ſeparate walks, according to the following plan.



London.

In building this expenſive ſtructure there was an eye not only to magnificence, and to accommodate the merchants, but alſo to reimburſe the expence. For this reaſon a gallery was built over the four ſides of the Royal Exchange. This was divided into 200 ſhops, which were let out to haberdaſhers, milliners, &c. and which for ſeveral years were well occupied. But theſe ſhops have now for a long time been deſerted, and the galleries are let out to the Royal Exchange Aſſurance-Office, the Merchant-ſeamen's Office, the Marine Society, and to auctioneers, &c. Under the whole area there are the fineſt dry vaults that can be found anywhere, which are let out to the Eaſt-India Company to depoſite their pepper. In the turret is a good clock with four dials, which is well regulated every day, ſo that it becomes a ſtandard of time to all the mercantile part of the town; and it goes with chimes at three, ſix, nine, and twelve o'clock, playing upon twelve bells. The outſide of this grand fabric ſuffers very much in its elegance from the ſhops that ſurround it, and are built within its walls; and which are occupied by bookſellers, toymen, cutlers, hoſiers, watchmakers, &c.

63 General Poſt Office.

South of the Royal Exchange, and near the weſt extremity of Lombard-ſtreet, is the *General Poſt Office*, which is a handſome and commodious building.

64 The Manſion-houſe.

In Walbrook ward is the *Manſion-houſe*, for the reſidence of the lord mayor. This edifice was begun in 1739, and finiſhed in 1753. It is built of Portland ſtone, with a portico of ſix fluted columns, of the Corinthian order, in the front. The baſement ſtory is very maſſy, and conſiſts of ruſtic work; in the centre of it is the door, which leads to the kitchen, cellars, and other offices. On each ſide riſes a flight of ſteps, leading up to the portico, in the middle of which is the principal entry. The ſtone baluſtrade of the ſtairs is continued along the front of the portico, and the columns ſupport a large angular pediment, adorned with a group of figures in bas relief, repreſenting the dignity and opulence of the city of London. It is an extremely heavy building, of an oblong form, and its depth is the long ſide, having ſeveral magnificent apartments, which are not, however, well lighted, on account of the houſes that ſurround it.

65 St Stephen's Church.

Behind the Manſion-houſe is *St Stephen's Church*, in Walbrook, juſtly reputed the maſterpiece of the celebrated Sir Chriſtopher Wren, and is ſaid to exceed every modern ſtructure in the world in proportion and elegance.

The Manſion-houſe, and many adjacent buildings, ſtand on the place where the *Stocks-market* once ſtood. This took its name from a pair of ſtocks erected near the ſpot in 1281; and was the great market of London for proviſions during many centuries.

66 London-ſtone.

In this ward is ſituated one of the moſt remarkable pieces of antiquity in London. It is a great ſtone, now ſtanding in a caſe on the north ſide of Canon-ſtreet, cloſe under the ſouth wall of St Swithin's church. It is called *London-ſtone;* and was formerly pitched edgeways on the other ſide of the ſtreet, oppoſite to where it now ſtands, fixed deeply in the ground, and ſtrongly faſtened with iron bars; but for the conveniency of wheel-carriages it was removed to its preſent ſituation. This ſtone is mentioned ſo early as the time of Athelſtan, king of the Weſt Saxons, and has been carefully preſerved from age to age. Of the original cauſe of its erection no memorial remains; but it is conjectured, that as London was a Roman city, this ſtone might be the centre, and might ſerve as an object from which the diſtance was computed to the other conſiderable cities or ſtations in the province.

London.

67 Merchant-Taylors School.

In Dowgate ward is a noted academy, called *Merchant-Taylors School*, from its having been founded by the merchant-taylors company, in the year 1561. It was deſtroyed by the fire of London in 1666, but was rebuilt, and is a very large ſtructure, with commodious apartments for the maſters and uſhers, and a fine library. Sir Thomas White, lord mayor of this city, having founded St John's college in Oxford in 1557, appointed this ſchool as a ſeminary for it, and eſtabliſhed at Oxford 46 fellowſhips for ſcholars elected from this ſchool.

68 St Mary le Bow.

The church of *St Mary le Bow*, in Cordwainers-ſtreet ward, is the moſt eminent parochial church in the city. It was originally built in the reign of William the Conqueror; and being the firſt church the ſteeple of which was embelliſhed with ſtone arches or bows, took thence its denomination of le Bow. It was burnt down in the fire of 1666, but ſoon afterwards rebuilt. The ſteeple of this church is reckoned the moſt beautiful of its kind in Europe.

69 Guildhall.

In Cheap ward is *Guildhall*, or the townhouſe of London. This was originally built in 1411, but ſo damaged by the great fire already mentioned, as to be rebuilt in 1669. The front has a Gothic appearance; and this character is alſo due to the two gigantic effigies which ſtand within the hall. The hall is 153 feet long, 50 broad, and 55 high, adorned with the royal arms, and thoſe of the city and its companies, as well as with ſeveral portraits of Engliſh ſovereigns and judges. In this building are many apartments for tranſacting the buſineſs of the city, beſides one for each of the judicial courts, namely, that of the King's Bench, the Common Pleas, and the Exchequer.

70 Cheapſide.

In the year 1246 Cheapſide was an open field, named *Crown field*, from an inn with the ſign of the crown. At that time, and even for 200 years afterwards, none of the ſtreets of London were paved excepting Thames-ſtreet, and from Ludgate-hill to Charing-Croſs.

71 Goldſmiths Hall.

Goldſmiths Hall ſtands in Foſter-lane, which opens into the weſt end of Cheapſide.—In this lane alſo is St Martin's le Grand, which, though ſurrounded by the city, was yet ſubject, near three centuries, to Weſtminſter Abbey. A fine college was built here in 700 by Wythred king of Kent; and, about the year 1056, rebuilt and chiefly endowed by Ingelric and Edward, two noble brothers. In 1068, it was confirmed and made independent of every other eccleſiaſtical juriſdiction, even that of the pope himſelf not excepted; and its privileges were confirmed by ſucceeding monarchs. It was governed by a dean, and a number of ſecular canons. In this juriſdiction a magnificent church was erected, but pulled down in 1548, when the college was ſurrendered; after which a tavern was erected on the ſpot.

72 St Martin le Grand.

Croſs and Conduit.

A little to the weſtward of Mary le Bow church (in the adjoining ward), ſtood the *Croſs* and *Conduit* in the middle of the ſtreet. The former was built by Edward I. in 1290, in memory of his queen Eleanor, whoſe body was reſted on that ſpot in its way to be buried. Originally it had the ſtatue of the queen at full length, reſembling exactly that at Northampton. Having at length fallen to decay, it was rebuilt in 1441 by John Hutherby mayor of the city, at the expence of ſeveral citizens, being now ornamented with various images, as thoſe of the Reſurrection, the Virgin Mary, &c. As the magnificent proceſſions took this road, it was new gilt at every public entry. After the Reformation, the images gave ſo much offence, that it was thought proper to ſubſtitute that of Diana in place of the Virgin Mary. This, however, was reſented by Queen Elizabeth, who offered a reward for the diſcovery of the offenders. As ſhe imagined that a croſs, the ſymbol of the Chriſtian religion, could not juſtly give offence to any profeſſor of that religion, ſhe ordered a croſs to be placed on the ſummit and gilt; but in 1643, the parliament ordered the demolition of all croſſes and other marks of Romiſh ſuperſtition.

Splendid tournaments were held between the Croſs and Sopers-lane in the year 1331; but as Queen Philippa and a great number of other ladies, dreſſed in rich attire, were ſitting on the upper ſcaffolding to behold the ſports, the ſeat gave way, and they ſuddenly fell down among the knights and others who ſtood below; many of whom were grievouſly hurt. The carpenters were ſaved from puniſhment by the interceſſion of the queen; but the king, to prevent accidents of the like nature, ordered a building of ſtone to be erected near Bow church, from whence the queen and other ladies might behold ſuch ſpectacles in ſafety. This was uſed for the ſame purpoſe till the year 1410, when Henry IV. granted it to certain mercers, who converted it into ſhops, warehouſes, and other places neceſſary for their trade.

A ſmall diſtance eaſtward from the Croſs ſtood the Conduit, which ſerved to fill the leſſer ones with water brought by pipes from Paddington.—This ſtood on the ſpot where the old conduit was ſituated, which was founded in 1285, conſtructed of ſtone lined with lead, and rebuilt in 1479 by Thomas Ilan, one of the ſheriffs. On ſome grand occaſions, theſe conduits have been made to run with claret; as at the coronation of Anna Bullen.

74 Mercers Hall. On the north ſide of Cheapſide ſtood the *Hoſpital of St Thomas of Acon*, founded by Fitz-Theobald de Helles, and his wife Agnes, ſiſter to the famous Thomas à Becket. The hoſpital was built 20 years after the murder of Thomas; and ſuch was his reputation for ſanctity, that it was dedicated to him even before he was canonized, and that in conjunction with the Virgin Mary herſelf. The whole was granted by King Henry VIII. to the company of mercers. It was deſtroyed by the great fire in 1666; but rebuilt by the mercers company, who have their hall here.—Immediately to the eaſt is a narrow ſtreet called the *Old* 75 Old Jewry. *Jewry*, which took its name from a great ſynagogue which ſtood here till the Jews were expelled the kingdom in 1291. After them an order of friars named *Fratres de pœce*, or *de penitentia*, took poſſeſſion of the ſynagogue: and in 1305, Robert Fitzwalter, the great banner-bearer of the city, requeſted that the friars might aſſign it to him; the reaſon of which probably was, that it ſtood near to his houſe, which was ſituated in the neighbourhood of the preſent Grocers-hall. The chapel was bought by the grocers from Fitzwalter in 1411 for 320 marks.

76 Blackwell Hall. In Baſſiſhaw or Baſinghall ward, is *Blackwell* or *Bakewell hall*, which adjoins to Guildhall, and is the greateſt mart of woollen cloth in the world. It was purchaſed of King Richard II. by the city; and has ever ſince been uſed as a weekly market for broad and narrow woollen cloths, brought out of the country. Formerly proclamations were iſſued to compel people to bring their goods into the hall, to prevent deceit in the manufactures, which might be productive of diſcredit in foreign markets, and likewiſe be the means of defrauding the poor children of Chriſt's hoſpital of part of the revenue which aroſe from the hallage of this great magazine. It ſuffered in the general devaſtation in 1666, but was rebuilt in 1672, and is now a ſpacious edifice, with a ſtone front adorned with columns.

77 Sion College. Cripplegate ward is remarkable for a college, called *Sion College*, founded in 1627, on the ſite of Elſing-hoſpital (D) or priory, by Dr Thomas White, vicar of St Dunſtan's in the Weſt, for the improvement of the London clergy; and with alms houſes, under their care, for 20 poor perſons, 10 men and 10 women. In the year 1631, a charter was procured for incorporating the clergy of London, by which they were conſtituted fellows of the college; and out of the incumbents are annually elected, on Tueſday three weeks after Eaſter, a preſident, two deans, and four aſſiſtants, who are to meet quarterly, to hear a Latin ſermon, and afterwards be entertained at dinner in the college-hall at the expence of the foundation. John Simpſon, rector of St Olaves, who ſuperintended the building, added, at his own expence, for the uſe of the ſtudious part of the London clergy, a library 120 feet long, and amply filled with books.

78 Barbers Hall. In this ward is a hall which belonged to the company of barber-ſurgeons, the profeſſions of barber and ſurgeon being formerly exerciſed by the ſame perſon. It was built by the celebrated Inigo Jones, and the upper end is formed out of one of the towers or barbicans of London wall. The anatomical theatre is elliptical, and very finely contrived. This hall is now called *Barbers hall*; the ſurgeons, who diſdained to be any longer aſſociated with their ancient brethren, having obtained a ſeparate charter, and built themſelves a new hall in the Old Bailey.

79 St Paul's Cathedral. Farringdon ward within, is diſtinguiſhed by the moſt magnificent Proteſtant church in the world, the cathedral of *St Paul*. The beſt authority we have for the origin of this church, is from its great reſtorer Sir Chriſtopher Wren. His opinion that there had been

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(D) This was founded by William Elſing mercer in 1329 (on the ſite of a decayed nunnery), for the ſupport of 100 blind men. He afterwards changed it into a priory, and became himſelf the firſt prior, who with four canons-regular were to ſuperintend the miſerable objects.

a church on this ſpot, built by the Chriſtians in the time of the Romans, was deſtroyed: when he ſearched for the foundations for his own deſign, he met with those of the original *presbyterium*, or ſemicircular chancel, of the old church. They conſiſted only of Kentiſh rubble ſtone, artfully worked, and conſolidated with exceedingly hard mortar, in the Roman manner, much excelling the ſuperſtructure. He explodes the notion of there having been here a temple of Diana, and the diſcovery of the horns of animals uſed in the ſacrifices to that goddeſs, on which the opinion had been founded, no ſuch having been diſcovered in all his ſearches.

The firſt church is ſuppoſed to have been deſtroyed in the Diocleſian perſecution, and to have been rebuilt in the reign of Conſtantine. This was again demoliſhed by the pagan Saxons; and reſtored, in 603, by Sebert, a petty prince, ruling in theſe parts, under Ethelbert king of Kent, the firſt Chriſtian monarch of the Saxon race; who, at the inſtance of St Auguſtine, appointed Melitus the firſt biſhop of London. Erkenwald, the ſon of King Offa, fourth in ſucceſſion from Melitus, ornamented his cathedral very highly, and improved the revenues with his own patrimony. He was moſt deſervedly canonized: for the very litter, in which he was carried in his laſt illneſs, continued many centuries to cure fevers by the touch; and the very chips, carried to the ſick, reſtored them to health!

When the city of London was deſtroyed by fire, in 1086, this church was burnt; the biſhop Mauritius began to rebuild it, and laid the foundations, which remained till its ſecond deſtruction, from the ſame cauſe, in the laſt century. Notwithſtanding Mauritius lived twenty years after he had begun this pious work, and Biſhop Beauvages enjoyed the ſee twenty more, yet ſuch was the grandeur of the deſign, that it remained unfiniſhed. The firſt had the ruins of the Palatine Tower beſtowed on him, as materials for the building; and Henry I. beſtowed on Beauvages part of the ditch belonging to the Tower, which, with purchaſes made by himſelf, enabled him to encloſe the whole with a wall. The ſame monarch granted, beſides, that every ſhip which brought ſtone for the church, ſhould be exempted from toll; he gave him alſo all the great fiſh taken in his precincts, except the tongues; and, laſtly, he ſecured to him and his ſucceſſor the delicious tythes of all his veniſon in the county of Eſſex.

The ſtyle of the ancient cathedral was a moſt beautiful Gothic; over the eaſt end was an elegant circular window; alterations were made in the ends of the two tranſepts, ſo that their form is not delivered down to us in the correct plans; and from the centre tower roſe a lofty and moſt graceful ſpire. The dimenſions, as taken in 1309, were theſe. The length ſix hundred and ninety feet; the breadth a hundred and twenty: the height of the roof of the weſt part, from the floor, one hundred and two; of the eaſt part, a hundred and eighty-eight; of the tower, two hundred and ſixty; of the ſpire, which was made of wood covered with lead, two hundred and ſeventy-four. The whole ſpace the church occupied was three acres, three roods, and twenty-one perches.

We may be aſtoniſhed at this amazing building, and naturally inquire what fund could ſupply money to ſupport ſo vaſt an expence. Kings granted their revenues for a time; others gave materials, which were brought to the place free of toll; they furniſhed wood from the royal foreſts: prelates gave up much of their revenues; and, what was more than all, by the pious bait of indulgences, and remiſſions of penance, brought in from the good people of this realm moſt amazing ſums. Pope Innocent III. in 1252, gave a releaſe of ſixty days penance; the archbiſhop of Cologne gave, a few years before, a relaxation of fifty days; and Boniface archbiſhop of Canterbury, forty days.

The high altar dazzled with gems and gold, the gifts of its numerous votaries. John king of France, when priſoner in England, firſt paying his reſpects to St Erkenwald's ſhrine, offered four baſons of gold: and the gifts at the obſequies of princes, foreign and Britiſh, were of immenſe value. On the day of the converſion of the tutelar ſaint, the charities were prodigious, firſt to the ſouls, when an indulgence of forty days pardon was given, *vere pœnitentibus, contritis et confeſſis*; and, by order of Henry III. fifteen hundred tapers were placed in the church, and fifteen thouſand poor people fed in the churchyard.

The holineſs of this place did not prevent thieves and profligates of all denominations from lurking within the precincts, and committing, under the favour of the night, murders and every ſort of crime. Edward I. gave the dean and canons permiſſion to encloſe the whole within a wall; and to have gates to be ſhut every night, to exclude all diſorderly people. Within theſe walls, on the north-weſt ſide, was the biſhop's palace. Froiſſart tells us, that after the great tournament in Smithfield, King Edward III. and his queen lodged here, on occaſion of their nuptials (E).—In 1561, the noble ſpire was totally burnt by lightning, and never reſtored.

In conſequence of the reſolutions taken in 1620, by James I.

(E) Before this cathedral was the famous *Paul's Croſs*, a pulpit formed of wood, mounted upon ſteps of ſtone, and covered with lead, in which the moſt eminent divines were appointed to preach every Sunday in the forenoon. To this place, the court, the mayor and aldermen, and principal citizens, uſed to reſort. The greateſt part of the congregation ſat in the open air; the king and his train had covered galleries; and the better ſort of people were alſo protected from the injury of the weather; but the far greater part ſtood expoſed in the open air: for which reaſon the preacher went in very bad weather to a place called the Shrouds; a covered ſpace on the ſide of the church, to protect the congregation in inclement ſeaſons. (Conſiderable contributions were raiſed among the nobility and citizens, to ſupport ſuch preachers as were (as was often the caſe) called to preach from either of the univerſities. In particular, the lord mayor and aldermen ordered that every preacher, who came from a diſtance, ſhould be freely accommodated, during five days, with ſweet and convenient lodging, fire, candle, .

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James I. to repair the cathedral, the celebrated Inigo Jones was appointed to the work. But it was not attempted till the year 1633, when Laud laid the firſt ſtone, and Inigo the fourth. That great architect begun with a moſt notorious impropriety, giving to the weſt end a portico of the Corinthian order, beautiful indeed, to this ancient Gothic pile; and to the ends of the two tranſepts Gothic fronts in a moſt horrible ſtyle. The great fire made way for the reſtoring of this magnificent pile in its preſent noble form by Sir Chriſtopher Wren, an architect worthy of ſo great a deſign.

It is built of fine Portland ſtone, in form of a croſs. On the outſide are two ranges of pilaſters, conſiſting of a hundred and twenty each; the lower range of the Corinthian order, and the upper of the compoſite. The ſpaces between the arches of the windows and the architrave of the lower order, are filled with a great variety of curious enrichments, as are alſo thoſe above. On the north ſide is a portico, the aſcent to which is by twelve ſteps of black marble, and its dome ſupported by ſix very large columns. Over the dome is a pediment, the face of which is engraved with the royal arms, regalia, and other ornaments. On the ſouth is a portico, the aſcent to which is by twenty-five ſteps, and its dome ſupported by ſix columns. correſponding with thoſe on the north ſide. The weſt front is graced with a moſt magnificent portico, ſupported by twelve lofty Corinthian columns: over theſe are eight columns of the compoſite order, which ſupport a noble pediment, crowned with its acroteria, and in this pediment is the hiſtory of St Paul's converſion, boldly carved in bas relief. The aſcent to this portico is by a flight of ſteps of black marble, extending the whole length of the portico; and over each corner of the weſt front is a beautiful turret. A vaſt dome, or cupola, riſes in the centre of the building. Twenty feet above the roof of the church is a circular range of thirty-two columns with niches, placed exactly againſt others within. Theſe are terminated by their entablature, which ſupports a handſome gallery, adorned with a ſtone baluſtrade. Above the columns laſt mentioned is a range of pilaſters, with windows between them: and from the entablature of theſe, the diameter of the dome gradually decreaſes. On the ſummit of the dome is an elegant balcony, from the centre of which runs a beautiful lanthorn, adorned with Corinthian columns. The whole is crowned with a copper ball, ſupporting a croſs, both finely gilt. Within, the cupola ſtands on eight ſtupendous pillars, curiouſly adorned: the roof of the choir is ſupported by ſix pillars, and that of the church by two ranges, conſiſting of twenty more. The roof of the church and choir is adorned with arches and ſpacious peripheries of enrichments, admirably carved in ſtone. Quite round the inſide of the cupola, there is a whiſpering iron balcony, or gallery, the top of which is richly painted by Sir James Thornhill.

The firſt ſtone of this ſuperb edifice was laid on June 21, 1675; and the building was completed in 1710; but the whole decorations were not finiſhed till 1723. It was a moſt ſingular circumſtance, that, notwithſtanding it was 35 years in building, it was begun and finiſhed by one architect, and under one prelate, Henry Compton biſhop of London. The church of St Peter's was 135 years in building, in the reigns of 19 popes, and went through the hands of twelve architects. It is not, as often miſtaken, built after the model of that famous temple: it is the entire conception of our great countryman, and has been preferred in ſome reſpects, by a judicious writer, to even the Roman Baſilica. Its dimenſions are leſs. The comparative view is given in the Parentalia, and copied in London and its Environs. The height of St Peter's, to the top of the croſs, is 437 feet and an half; that of St Paul's 340 feet; ſo that, from its ſituation, it is lofty enough to be ſeen from the ſea. The length of the firſt is 729 feet; of the latter, 500. The greateſt breadth of St Peter's is 364; of St Paul's, 180.

In the reigns of James I. and Charles I. the body of this cathedral was the common reſort of the politicians, the news-mongers, and idle in general. It was called *Paul's walk;* and is mentioned in the old plays and other books of the times.

Nothwithſtanding the magnificence of this noble pile, however, it is remarked to have many defects. Its ſituation is ſuch, that it cannot be viewed at a diſtance. The diviſion of the porticos, and the whole ſtructure, into two ſtories on the outſide, certainly indicates a like diviſion within, which is acknowledged to be a fault. The dome, it has alſo been obſerved, bears too great a proportion to the reſt of the pile, and ought to have been raiſed exactly in the centre of the building; beſides that, there ought to have been two ſteeples at the eaſt end, to correſpond with thoſe at the weſt. On entering this church, we inſtantly perceive an obvious deficiency, not only of elevation but length, to aſſiſt the perſpective; and the columns are heavy and clumſy, rather encumbering the proſpect than enriching it.

St Paul's occupies an area of ſix acres, and is railed all round with iron baluſtrades, each about five feet and a half high, fixed on a dwarf wall of hewn ſtone. In the weſt end of this area is a marble ſtatue of Queen Anne, holding a ſceptre in one hand, and a globe

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candle, and all neceſſaries. And notice was given by the biſhop of London, to the preacher appointed by him, of the place he was to repair to.

We hear of this being in uſe as early as the year 1259. It was uſed, as Mr Pennant obſerves, not only for the inſtruction of mankind by the doctrine of the preacher, but for every purpoſe political or eccleſiaſtical; for giving force to oaths, for promulging of laws, or rather the royal pleaſure, for the emiſſion of papal bulls, for anathematizing ſinners, for benedictions, for expoſing of penitents under cenſure of the church, for recantations, for the private ends of the ambitious, and for the defaming of thoſe who had incurred the diſpleaſure of crowned heads.

It was demoliſhed in 1643 by order of parliament, executed by the willing hands of Iſaac Pennington this fanatical lord mayor of that year, who died in the Tower a convicted regicide.

ondon. globe in the other, ſurrounded with four emblematical figures repreſenting Great Britain, France, Ireland, and America.

Beſides very large contributions for carrying on this edifice, the parliament granted a duty on ſea-coal, which, at a medium, produced 5000l. a-year; and the whole expence of the building is ſaid to have amounted to 736,752l. 2s. 3d.

On the eaſt ſide of the cathedral is *St Paul's School*, founded in 1509 by Dr John Collet dean of this church, who endowed it for a principal maſter, an under-maſter, a chaplain, and 153 ſcholars.

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lege of
ysicians.

In Warwick-lane, in the ſame ward, ſtands the *College of Phyſicians*, erected in 1682 by Sir Chriſtopher Wren. It is built of brick, and has a ſpacious ſtone frontiſpiece. Near the ſouth extremity of the Old Bailey, on the eaſt ſide, is the hall of the Company of Surgeons, with a theatre for diſſection.

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iſt's
ſpital.

Adjoining to Chriſt-church in Newgate-ſtreet is *Chriſt's Hoſpital*, which, before the diſſolution of monaſteries by Henry VIII. was a houſe of Gray-friars. The hoſpital was founded by King Edward VI. for ſupporting and educating the fatherleſs children of poor freemen of this city; of whom 1000 of both ſexes are generally maintained in the houſe or out at nurſe, and are likewiſe clothed and educated. In 1673, a mathematical ſchool was founded here by Charles II. endowed with 320l. a-year; and a writing ſchool was added in 1694 by Sir John Moor, an alderman of the city. After the boys have been ſeven or eight years on the foundation, ſome are ſent to the univerſity and others to ſea; while the reſt, at a proper age, are put apprentices to trades at the charge of the hoſpital. At firſt their habit was a ruſſet cotton, but was ſoon after changed for blue, which has ever ſince continued to be their colour; and on this account the foundation is frequently called the *Blue-coat hoſpital*. The affairs of this charity are managed by a preſident and about 300 governors, beſides the lord mayor and aldermen. The fabric, which is partly Gothic and partly modern, was much damaged by the fire of 1666, but was ſoon repaired, and has been ſince increaſed with ſeveral additions. The principal buildings, which form the four ſides of an area, have a piazza round them with Gothic arches, and the walls are ſupported by abutments. The front is more modern, and has Doric pilaſters ſupported on pedeſtals.

82
ctors
mmons.

In Caſtle-Baynard ward is a large ſtructure called *Doctors Commons*. It conſiſts of ſeveral handſome paved courts, in which the judges of the court of admiralty, thoſe of the court of delegates, of the court of arches, and the prerogative court, with the doctors that plead cauſes, and the proctors of the place, all live in a collegiate way; and from commoning together, as in other colleges, the name of Doctors Commons is derived. Here courts are kept for the trial of civil and eccleſiaſtical cauſes under the archbiſhop of Canterbury and the biſhop of London. The college has an excellent library, every biſhop at his conſecration giving 25l. or 50l. towards purchaſing books for it.

83
llege of
eralds.

Near Doctors Commons, on St Bennet's Hill, is the *College of Heralds*, who were incorporated by King Richard III. Beſides the chief officer, who is the earl-marſhal of England, here are three kings at arms, viz. Garter, Clarencieux, and Norroy, with ſix heralds, four purſuivants, and eight proctors. Garter attends the inſtalments of knights of that order, carries the garter to foreign princes, regulates the ceremonies at coronations, and the funerals of the royal family and nobility: Clarencieux directs the funeral ceremonies of thoſe under the degree of peers ſouth of Trent; and Norroy performs the like office for thoſe north of Trent. This building was originally the houſe of the earl of Derby. It is a ſpacious quadrangle, built of brick, and has convenient apartments. Here are kept records of the coats of arms of all the families and names in England, with an account when they were granted, and on what occaſion.

84
Bridewell.

In Farringdon ward without, is a large building called *Bridewell*, from a ſpring formerly known by the name of St Bridget's or St Bride's Well. It was originally a royal palace, and occupied all the ground from Fleet-ditch on the eaſt to Water-lane on the weſt. That part of it now called *Saliſbury-court* was given to the biſhops of Saliſbury for their town reſidence; and the eaſt part, which was rebuilt by King Henry VIII. is the preſent Bridewell. It was granted to the city by Edward VI. as an hoſpital; and he endowed it for the lodging of poor travellers, and for the correction of vagabonds, ſtrumpets, and idle perſons, as well as for finding them work. In one part of the building 20 artificers have houſes; and about 150 boys, diſtinguiſhed by white hats and blue doublets, are put apprentices to glovers, flaxdreſſers, weavers, &c. and when they have ſerved their time are entitled to the freedom of the city, with 10l. towards carrying on their reſpective trades. The other part of Bridewell is a receptacle for diſorderly perſons, who are kept at beating hemp and other hard labour.

Near Bridewell is *St Bride's Church*, a ſtately fabric 111 feet long, 57 broad, and 41 high, with a beautiful ſpire 234 feet in altitude, and has a ring of 12 bells in its tower.

85
Blackfriars
Bridge.

Oppoſite to Fleet-ditch, over this part of the river, ſtands *Blackfriars Bridge*; a moſt elegant ſtructure, built after the deſign of Mr Robert Mylne. The ſituation of the ground on the two ſhores obliged the architect to employ elliptical arches; which, however, have a very fine effect. The number of arches is nine; of which the centre one is 100 feet wide. The whole length is 995 feet; the breadth of the carriage-way is 28 feet, and that of the two foot-ways 7 each. Over each pier is a receſs; an apology for the beautiful Ionic pillars which ſupport them, and which have a moſt beautiful effect from the river. This bridge was begun in 1760; and finiſhed in 1768, at the expence of 152,840l. to be diſcharged by a toll upon the paſſengers. It is ſituated almoſt at an equal diſtance between thoſe of Weſtminſter and London, commands a view of the Thames from the latter to Whitehall, and diſcovers the majeſty of St Paul's in a very ſtriking manner.

86
Smithfield.

Weſt Smithfield. In this ward is an area containing three acres of ground, called in old records *Smithfield-Pond* or *Horſe-Pool*, it having been formerly a watering place for horſes. It was in ancient times the common place of execution; and at the ſouth-weſt corner there was a gallows called the *Elms*, from a number of elm-trees that grew in the neighbourhood. It was likewiſe the ſcene of public juſts and tournaments, and has been a market-place for cattle above 500 years.

87 St Bartholomew's hoſpital. On the ſouth ſide of this area, and contiguous to Chriſt's hoſpital, is *St Bartholomew's Hoſpital*. It was originally founded ſoon after the acceſſion of Henry I. by Rahere the king's jeſter, as an infirmary for the priory of St Bartholemew the Great, which then ſtood near the ſpot. But upon the diſſolution of religious houſes, Henry VIII. refounded it, and endowed it with 500 marks a-year, on condition that the citizens ſhould pay the ſame ſum annually for the relief of 100 lame and infirm patients. The endowments of this charity have ſince been ſo much enlarged, that it now receives the diſtreſſed of all denominations. In 1702, a beautiful frontiſpiece was erected towards Smithfield, adorned with pilaſters, entablature, and a pediment of the Ionic order, with a ſtatue of King Henry VIII. ſtanding in a niche in full proportion, and thoſe of two cripples on the top of the pediment over it. In 1729, a plan was formed for rebuilding the reſt of this hoſpital, in conſequence of which a magnificent edifice has been erected.

Among many other privileges granted by Henry I. to the prior and canons of the monaſtery of St Bartholomew the Great, and to the poor of the infirmary, was that of keeping a fair in Smithfield on the eve, day, and morrow, of St Bartholomew. This fair, called *Barthelomew-fair*, has been held annually ever ſince: and by the indulgence of the magiſtrates of London, to whom the privilege of keeping it devolved upon the diſſolution of the priory, it uſed to continue a fortnight. A great number of booths was erected in it by the actors of the theatres, for the exhibition of dramatic performances of various kinds; and it became at length a ſcene of ſo much licentiouſneſs and riot, that Sir John Barnard when lord mayor of London reduced the time of the fair to its original duration of three days. This laudable example has been followed ever ſince; and the magiſtrates have likewiſe prohibited all public exhibitions which had been formerly accompanied with ſo much diſorder.

88 Old Bailey. In a ſtreet in this ward, called the *Old Bailey*, is a hall named *Juſtice hall*, or the *Seſſions houſe*, where a court is held eight times a-year by the king's commiſſion of oyer and terminer for the trial of criminals for offences committed within the city of London and county of Middleſex. The judges of this court are the lord mayor, thoſe of the aldermen that have ſerved that office, and the recorder; who are attended by the ſheriffs and by one or more of the national judges.

89 Newgate. In this ſtreet is alſo the great criminal priſon, lately built in a much more convenient ſituation, and on a more enlarged plan, than the former priſon, called *Newgate*, by which name it is ſtill diſtinguiſhed. Here the unfortunate debtor will no longer be annoyed by the dreadful rattle of chains, or by the more horrid ſounds iſſuing from the lips of thoſe wretched beings who ſet defiance to all laws divine and human; and here alſo, the offender, whoſe crime is not capital, may enjoy all the benefits of a free open air.

90 Fleet priſon. In this ward is likewiſe a priſon called the *Fleet Priſon*, from a ſmall river named the Fleet which formerly ran by it: this building is large, and reckoned the beſt in the city for good rooms and other conveniences. It has the benefit of a large yard, which is encloſed with a very high wall. This priſon is as ancient as the reign of Richard I. and belongs to the court of chancery, &c.

91 The Rolls. In Chancery-lane, in this ward, is an office conſiſting of a houſe and chapel, called the office and chapel of the *Rolls*, them being the great repoſitory of the modern public rolls and records of the kingdom. This building was originally the houſe of an ancient Jew; but being forfeited to the crown, King Henry III. in the year 1223 converted it into a hoſpital for the reception and accommodation of ſuch Jews as ſhould become proſelytes. In 1377, Edward III. granted this hoſpital and its chapel to William Burſtall maſter of the rolls, to whoſe ſucceſſors in that office it has ever ſince belonged. Round this office there is a ſmall diſtrict conſiſting of about 200 houſes, called the *Liberty of the Rolls*, over which the magiſtrates of London have no authority, it being under the government of the maſter of the rolls.

In this ward are ſeveral *Inns* of court and chancery, particularly the Inner and Middle Temple, Serjeants Inn, Clifford's Inn, Barnard's Inn, Staple's Inn, and Furnival's Inn.

92 The Temple. The *Temple* received its name from being originally founded by the Knights Templars, who ſettled here in 1185. It was at firſt called the *New Temple*, to diſtinguiſh it from the former houſe of the Knights Templars, which ſtood in Holborn near Chancery lane.

The original building was divided into three parts; the Inner, the Middle, and the Outer Temple. The Inner and the Outer Temple were ſo called, becauſe one was within and the other was without the Bar; and the Middle derived its name from being ſituated between them. Upon the diſſolution of the order of Knights Templars, the New Temple devolved to the Knights Hoſpitallers of St John of Jeruſalem, who granted a leaſe of it to the ſtudents of the common law, and converted that part of it called Inner and Middle Temple into two inns of court for the ſtudy and practice of the common law. The Outer Temple became a houſe for the earl of Eſſex.

The buildings of the Temple eſcaped the fire in 1666, but were moſt of them deſtroyed by ſubſequent fires, and have ſince been rebuilt. The two Temples are each divided into ſeveral courts, and have pleaſant gardens on the banks of the Thames. They are appropriated to diſtinct ſocieties, and have ſeparate halls, where the members dine in common during term-time. The Inner Temple hall is ſaid to have been built in the reign of Edward III. and the middle Temple hall, which is a magnificent edifice, was rebuilt in 1572 in form of a college hall. The Middle Temple gate, Mr Pennant informs us, was erected by Sir Amias Powlet on a ſingular occaſion. It ſeems that Sir Amias, about the year 1501 thought fit to put Cardinal Wolſey, then parſon of Lymington, into the ſtocks. In 1515, being ſent for to London by the cardinal on account of that ancient grudge, he was commanded not to quit town till farther orders. In conſequence, he lodged five or ſix years in this gateway, which he rebuilt; and to pacify his eminence, adorned the front with the cardinal's cap, badges, cogniſance, and other devices of this butcher's ſon: ſo low were the great

London. men obliged to ſtoop to that meteor of the times! Each temple has a good library, adorned with paintings, and well furniſhed with books. An aſſembly, called a *parliament*, in which the affairs of the ſociety of the Inner Temple are managed, is held there every term. Both Temples have one church, firſt founded in 1185, by the Knights Templars; but the preſent edifice is ſuppoſed to have been built in 1420. It is ſupported by neat ſlender pillars of Suſſex marble, and is one of the moſt beautiful Gothic ſtructures in England. In this church are many monuments, particularly of nine Knights Templars cut in marble in full proportion, ſome of them ſeven feet and a half long; ſix are croſs-legged, and therefore ſuppoſed to have been engaged in the cruſades. The miniſter of this church, who is uſually called the *maſter of the Temple*, is appointed by the benchers or ſenior members of both ſocieties, and preſented by a patent from the crown. Shakeſpeare (whether from tradition or hiſtory) makes the Temple garden the place in which the badge of the white and red roſe originated; the diſtinctive badge of the houſes of York and Lancaſter, under which the reſpective partizans of each arranged themſelves in the fatal quarrel which cauſed ſuch torrents of Engliſh blood to flow.

Near the Temple bar is the *Devil's Tavern*, ſo called from its ſign of St Dunſtan ſeizing the evil ſpirit by the noſe with a pair of hot tongs. Ben Johnſon has immortalized it by his *Leges Conviviales*, which he wrote for the regulation of a club of wits held in a room he dedicated to Apollo; over the chimney-piece of which they are preſerved. The tavern was in his days kept by Simon Wadloe; whom, in a copy of verſes over the door of the Apollo, he dignified with the title of *King of Skinkers*.

93 Inns of Chancery. *Serjeants Inn* is a ſmall inn in Chancery-lane, where the judges and ſerjeants have chambers, but not houſes, as they had in another inn of this name in Fleet-ſtreet, which they abandoned in 1730; but in each of them there is a hall and a chapel. *Clifford's Inn* is an inn of chancery belonging to the Inner Temple. It was originally a houſe granted by Edward II. to the family of the Cliffords, from which it derived its name; but was afterwards let upon leaſe to the ſtudents of the law, and in the reign of Edward III. ſold to the members of this ſociety. *Bernard's Inn* is likewiſe an inn of chancery belonging to Gray's Inn. It ſtands in Holborn, and was the houſe of John Mackworth, dean of Lincoln, who gave it to the profeſſors of the law. *Staple's Inn* belongs alſo to Gray's Inn, and is ſituated in Holborn. It was once a hall for the merchants of the ſtaple for wool, whence it derives its name; but it was purchaſed by the benchers of Gray's Inn, and has been an inn of chancery ſince the year 1415. *Furnival's Inn* is an inn of chancery belonging to Lincoln's Inn, and was once the houſe of the family of the Furnivals, by whom it was let out to the profeſſors of the law. It is a large old building, with a hall and a pleaſant garden.

94 Bethlehem Hoſpital. In Coleman-ſtreet ward, on the ſouth ſide of a large ſquare called *Moorfields*, ſtood *Bethlehem Hoſpital*, founded in 1675 by the lord mayor and citizens of London for the reception and cure of poor lunatics. It was a noble edifice, built with brick and ſtone, and adorned with pilaſters, entablatures, and ſculpture; particularly with the figures of two lunatics over the grand gate, which are well executed. This building was 540 feet long and 40 broad, excluſive of two wings of a later erection, intended for the reception of ſuch lunatics as were deemed incurable. This hoſpital contained a great number of convenient cells or apartments, where the patients were maintained and received all medical aſſiſtance without any other expence to their friends than that of bedding. The ſtructure was divided into two ſtories, through each of which ran a long gallery from one end of the houſe to the other. On the ſouth ſide were the cells, and on the north the windows that gave light to the galleries, which were divided in the middle by handſome iron gates, to keep the men and women ſeparate. This hoſpital being pulled down, it is intended to erect another building for the uſe of the ſame charity, a ta ſhort diſtance from the metropolis. A new road is to be opened from the ſite of the old hoſpital to the Royal Exchange.

95 St Luke's Hoſpital. Oppoſite to Bethlehem hoſpital ſtood that of *St Luke*, a long plain building, till of late appropriated to the ſame purpoſes, but wholly independent of the former. It was founded on the humane conſideration that Bethlehem was incapable of receiving all the miſerable objects which were offered. Of late years the patients were removed from the old hoſpital to a new one erected under the ſame name in Old-ſtreet, on the plan of the former, extending in front 492 feet. The old hoſpital is now pulled down, and replaced by a handſome row of houſes. Uncured patients may be taken in again, by a very liberal regulation, on the payment of five ſhillings a week; ſo that their friends may, if they chooſe, try a ſecond time the force of medicine on their unhappy relations or acquaintances.

96 Different markets. Beſides the three markets already mentioned at Smithfield for cattle and hay, at Leadenhall for butchers meat, wool, hides, and Colcheſter baize, and at Billingſgate for fiſh; there are in this city the following other markets, which are all very conſiderable, viz. Honey-lane, Newgate, and Fleet-market, chiefly for fleſh, though with ſeparate diviſions for fiſh, butter, eggs, poultry, herbs, and fruit; and the Three-Cranes market, for apples and other fruit. The principal corn-market is held in a neat exchange ſituated in Market-lane, and that for flour at Queenhithe. In Thames-ſtreet, near Billingſgate, there is an exchange for dealers in coals and maſters of veſſels in that trade to tranſact their buſineſs.

97 The Borough of Southwark, its juriſdiction, &c. II. *The Borough of* SOUTHWARK. It was called by the Saxons *Suth*, or the "South work," in reſpect to ſome fort or fortification bearing that aſpect from London. It was alſo called the Borough, or *Burg*, probably from the ſame reaſon. It was long independent of the city of London: but, in conſideration of the inconveniences ariſing from the eſcape of malefactors from the great capital into this place, it was in 1327 granted by Edward III. to the city, on payment of 10l. annually. It was then called the *village* of Southwark; it was afterwards ſtyled the *bailiwick* of Southwark, and the mayor and commonalty of London appointed the bailiff. This power, however, not being ſufficient to remedy the evil, a more intimate connexion was thought neceſſary; and in the reign of Edward VI. on a valuable conſideration paid to the crown, it was formed into a 26th ward, by the title of *Bridge Ward Without*; with a reſervation of certain

privileges enjoyed there by the archbiſhop of Canterbury and ſome other eccleſiaſtics. In conſequence of this, it was ſubjected to the lord mayor of London, with the ſteward and bailiff. But Southwark being divided into two parts, this is to be underſtood of the diviſion called the *Borough Liberty*, which conſiſts of three of the pariſhes belonging to the town, with the greater part of a fourth pariſh. For the city diviſion, the lord mayor by his ſteward holds a court of record every Monday at the ſeſſions-houſe on St Margaret's Hill in this borough for all debts, damages, and treſpaſſes within the limits of his juriſdiction. The other diviſion is called the *Clink*, or the *Manor of Southwark*, and is ſubdivided into the Great Liberty, the Guildhall, and the King's Manor; for each of which ſubdiviſions a court-leet is held, where the conſtables, ale-
98 Courts. conners, and fleſh-taſters, are choſen, and other buſineſs of this kind tranſacted. A court-houſe, called *Union Hall*, has lately been built in the new ſtreet called *Union-ſtreet*, which leads in a direct line from the high-ſtreet in the Borough to Great Surry-ſtreet Blackfriars road. The Clink liberty is under the juriſdiction of the biſhop of Wincheſter, who, beſides a court-leet, keeps here a court of record on the Bankſide near St Saviour's church by his ſteward or bailiff, for pleas of debt, damages, and treſpaſſes. Court-leets are alſo kept at Lambeth, Bermondſey, and Rotherhithe, three ſmall diſtricts adjoining to the Borough.
99 Priſons. —There is a compter for the impriſonment of offenders in the bailiwick, and another for the Clink liberty; to which may be added the Surry workhouſe for vagrants. Beſides theſe, there is the Marſhalſea-priſon, which is the county gaol for felons, and the admiralty gaol for pirates (G); in which is a court firſt erected for trials of cauſes between the king's domeſtics or menial ſervants, of which the knight-marſhal is preſident, and his ſteward judge, to whom belong four counſellors and ſix attorneys; and the court is held every Friday by him or his deputy, for debt, damages, and treſpaſſes, in cauſes for 10 miles round Whitehall, excepting London. In this quarter is alſo the King's Bench priſon, the rules of which are above two miles in circuit, and compriſe the greateſt part of St George's Fields. Here was committed Henry prince of Wales, afterwards King Henry V. by the ſpirited and honeſt Judge Gaſcoigne, for ſtriking or inſulting him on the bench. In this priſon the allowance is ſomewhat better than that of the common priſons; for which reaſon, many debtors remove themſelves hither by *habeas corpus*. It is properly a place of confinement in all caſes triable in the King's Bench court.—The firſt time that Southwark is mentioned in hiſtory is on occaſion of Earl Goodwin's ſailing up the river to attack the royal navy of 50 ſhips lying before the palace of Weſtminſter: this was in 1052, when we are told he went *ad Suthweorce*, and ſtaid till there the return of the tide.

100 Pariſhes, &c. Southwark conſiſts of the pariſhes of St Olave, St Saviour, St George, and St Thomas; the pariſh of Chriſt-church, though contiguous to the borough, is in the county of Surry.

The principal church in Southwark is that of *St Saviour*, which was formerly a priory of regular canons. Being dedicated to the Virgin Mary, and ſituated near the bank of the Thames, it was called *St Mary Over Ree*, or *Overy*, by which appellation it is commonly known. This church is built in the manner of a cathedral, with three aiſles from eaſt to weſt, and a croſs aiſle. It is reckoned the largeſt pariſh-church in England, the three aiſles firſt mentioned meaſuring 269 feet in length, and the croſs aiſle 109 feet. The height within is 47 feet, and it has a tower with four ſpires 150 feet high.

Not far from St George's church ſtood the magnificent palace of Charles Brandon duke of Suffolk, the deſerved favourite of Henry VIII. After his death, in 1545, it came into the king's hands, who eſtabliſhed here a royal mint. It at that time was called *Southwark Place*, and in great meaſure preſerved its dignity. Edward VI. once dined in it. His ſiſter and ſucceſſor preſented it to Heath archbiſhop of York, as an inn or reſidence for him and his ſucceſſors whenever they repaired to London. As to the Mint, it became a ſanctuary for inſolvent debtors; but at length becoming the peſt of the neighbourhood, by giving ſhelter to villains of every ſpecies, that awakened the attention of parliament; which by the ſtatutes 8 and 9 Will. III. 9 George I. and 11 George I. entirely took away its abuſive privileges. 101

In the pariſh of Chriſt-church, near the water on Bankſide, ſtood *Paris-garden*, one of the ancient play-houſes of our metropolis. Ben Johnſon is reproached by one Decker, an envious critic, with his ill ſucceſs on the ſtage, and in particular with having performed the part of Zuliman at Paris-garden. It ſeems to have been much frequented on Sundays. This profanation (Mr Pennant obſerves) was at length fully puniſhed by the dire accident which befel the ſpectators in 1582, when the ſcaffolding ſuddenly fell, and multitudes of people were killed or miſerably maimed. The omen ſeems to have been accepted; for in the next century the manor of Paris-garden was erected into a pariſh, and a church founded under the name of Chriſt's. Ancient places of diverſion.

Beyond this place of amuſement were the Bear-garden and place for baiting of bulls, the *Britiſh circi*; "Herein (ſays Stow) were kept beares, bulls, and other beaſts to be bayted; as alſo maſtives in ſeveral kennels nouriſhed to bayt them. Theſe beares and other beaſts are there kept in plots of ground ſcaffolded about for the beholders to ſtand ſafe." This was then an amuſement for perſons of the firſt rank: our great, if not good, Elizabeth cauſed the French ambaſſadors to be carried to this theatre, to divert them with theſe bloody ſpectacles. 102

Not far from theſe ſcenes of cruel paſtime was the The Stews.

(G) In 1377 this priſon was broken open by a mob of ſailors, who murdered a gentleman confined in it for killing one of their comrades, and who had been pardoned by the court. It was again broken open by Wat Tyler and his followers in 1381. It eſcaped in the infamous riots of 1780, while the King's Bench, the Borough Priſon, and the Clink Priſon, were nearly at the ſame inſtant ſacrificed to their fury.

Bordello or *Stews*, permitted and openly licenſed by government, under certain laws or regulations. They were farmed out. Even a lord mayor did not diſdain to own them: but rented them to the *Froes*, that is, "the bawds," of Flanders. Among other ſingular regulations, no ſtewholder was to admit married women; nor were they to keep open their houſes on Sundays; nor were they to admit any women who had on them the perilous infirmity of burning. Theſe infamous houſes were very properly ſuppreſſed in the reign of Henry VIII.

The biſhop of Wincheſter had formerly a palace here with a park (the ſame that is now called *Southwark-park*), which is ſince converted into warehouſes and tenements, held by leaſe from the biſhops of that ſee.

103 St Thomas's Hospital. Beſides ſeveral alms-houſes, there are here *St Thomas's* and *Guy's Hoſpitals*, two of the nobleſt endowments in England. The former was firſt erected in 1215 by Peter de Rupibus biſhop of Wincheſter, who endowed it with land to the amount of 343l. a-year; from which time it was held of the abbots of Bermondſey, one of whom in 1428 granted a right to the maſter of the hoſpital to hold all the lands it was then in poſſeſſion of belonging to the ſaid abbot and convent, the whole revenue of which did not exceed 266l. 17s. 6d. per annum. In the year 1551, after the citizens of London had purchaſed of Edward VI. the manor of Southwark and its appurtenances, of which this hoſpital was a part, they expended 1100l. in repairing and enlarging the edifice, and immediately received into it 260 patients; upon which the king in 1553 incorporated this hoſpital with thoſe of Chriſt-church and Bridewell in the city of London. The building being much decayed, three beautiful ſquares adorned with colonnades were erected by voluntary ſubſcription in 1693, to which in 1732 the governors added a magnificent building, conſiſting of ſeveral wards with proper offices. The annual diſburſements of this hoſpital have for many years amounted to 8000l. The houſe is divided into 19 wards, and is ſaid to contain 474 beds.

104 Guy's Hoſpital. Adjoining to St Thomas's ſtand *Guy's Hoſpital*, perhaps the moſt extenſive charitable foundation that ever was eſtabliſhed by one man in private life. The founder of this hoſpital was Thomas Guy, a bookſeller in Lombard-ſtreet, London, who lived to ſee the edifice roofed in; and at his death, in 1724, left 238,292l. 16s. including the expence of the building, to finiſh and endow it. This hoſpital conſiſts of two capacious ſquares, containing 12 wards and 435 beds. It was incorporated by charter from parliament, and the firſt governors were appointed in 1725.

In St George's Fields, weſtward of the King's Bench priſon, is the *Magdalen Hoſpital* for the reception of penitent proſtitutes; a little farther is ſituated the Aſylum for orphan girls; and not far diſtant is the Weſtminſter Lying-in Hoſpital: Inſtitutions, of which the following feeling and animated account is given by Mr Pennant.

105 The Aſylum. "The *Aſylum* is an inſtitution of a moſt heavenly nature, calculated to ſave from perdition of ſoul and body the brighter part of the creation; ſuch on whom Providence hath beſtowed angelic faces and elegant forms, deſigned as bleſſings to mankind, but too often debaſed to the vileſt uſes. The hazard that theſe innocents conſtantly are liable to from a thouſand temptations, from poverty, from death of parents, from the diabolical procureſs, and often from the ſtupendous wickedneſs of parents themſelves, who have been known to ſell their beauteous girls for the purpoſe of proſtitution, induced a worthy band to found in the year 1758 the Aſylum or Houſe of Refuge. Long may it flouriſh, and eternal be the reward of thoſe into whoſe minds ſo amiable a conception entered!

106 The Magdalen Hoſpital. "To afford means of ſalvation to thoſe unhappy beings who had the ill fortune to loſe the benefits of this divine inſtitution, the *Magdalen Hoſpital* was inſtituted for the reception of the penitent proſtitutes. To ſave from vice, is one great merit. To reclaim and reſtore to the dignity of honeſt rank in life, is certainly not leſs meritorious. The joy at the return of one ſinner to repentance is eſteemed by the higheſt authority worthy of the heavenly hoſt. That ecſtaſy, I truſt, this inſtitution has often occaſioned. Since its foundation in the ſame year with the former, to December 25. 1786, not fewer than 2471 have been admitted. Of theſe (it is not to be wondered that long and evil habits are often incurable) 300 have been diſcharged, uneaſy under conſtraint; 45 proved lunatics, and afflicted with incurable fits; 60 have died; 52 never returned from hoſpitals they were ſent to; 338 diſcharged for faults and irregularities. How to be dreaded is the entrance into the bounds of vice, ſince the retreat from its paths is ſo difficult! Finally, 1608 prodigals have been returned to their rejoicing parents; or placed in reputable ſervices, or to honeſt trades, banes to idleneſs and ſecurities againſt a future relapſe." Into this charity, every woman who has been ſeduced (and is not pregnant or diſeaſed), whether recommended or not, may apply for admiſſion to the committee, who meet for that purpoſe on the firſt Tueſday in every month.

107 Lying-in Hoſpital. Akin to thoſe charities is that of the *Lying-in Hoſpital*: which is not intended merely for the reception of "the honeſt matron who can depoſite her burden with the conſciouſneſs of lawful love; but alſo for the unhappy wretches whom ſome villain in the unguarded moment has ſeduced, and then left a prey to deſertion of friends, to poverty, want, and guilt.—Leſt ſuch 'may be driven to deſpair by ſuch complicated miſery, and be tempted to deſtroy themſelves and murder their infants,' here was founded in 1765 this humane preventive, the Weſtminſter New Lying-in Hoſpital, in which every aſſiſtance and accommodation requiſite in ſuch ſituations are provided in the moſt attentive and liberal manner. To obviate all objection to its being an encouragement to vice, no one is taken in a ſecond time: but this moſt excellent charity is open to the worthy diſtreſſed matron as often as neceſſity requires. None are rejected who have friends to recommend. And of both deſcriptions upwards of 4000 have experienced its ſalutary effect."

108 St George's Fields. St George's Fields are now almoſt covered with new erected buildings, from the ditch at the end of Great Surry-ſtreet, or Burrow's Buildings, to the Fiſhmongers alms-houſes, in one direction; and from the Marſhalſea priſon to the Dog and Duck, in the other direction; with ſeveral irregular indentations in its circumference: And where the principal roads meet, an obeliſk has been erected, pointing out the diſtance it ſtands

London. from different parts of London, Weſtminſter, and Blackfriars bridges. Among the buildings which ſerve to embelliſh and improve this entrance to London, Chatham-ſquare and Bridgeſtreet-Blackfriars may be particularly ſpecified.

109 Lambeth Palace. At *Lambeth*, the archbiſhops of Canterbury have had a palace. According to Mr Pennant, it was in the earlier times a manor, poſſibly a royal one: for the great Hardiknut died here in 1042, in the midſt of the joys of a wedding dinner; and here, without any formality, the uſurper Harold is ſaid to have ſnatched the crown and placed it on his own head. At that period it was part of the eſtate of Goda, wife to Walter earl of Mantes, and Euſtace earl of Boulogne; who preſented it to the church of Rocheſter, but reſerved to herſelf the patronage of the church. It became in 1197 the property of the ſee of Canterbury, by exchange tranſacted between Glanville biſhop of Rocheſter and the archbiſhop Hubert Walter. The building was improved by Langton the ſucceſſor of Walter; but it was afterwards neglected and became ruinous. "No pious zeal (ſays Mr Pennant) reſtored the place, but the madneſs of prieſtly pride. Boniface, a wrathful and turbulent primate, elected in 1244, took it into his head to become a viſitor of the priory of St Bartholomew, to which he had no right. The monks met him with reverential reſpect, but aſſured him the office did not belong to the biſhop. The meek prelate ruſhed on the ſub-prior, knocked him down, kicked, beat, and buffeted him, tore the cope off his back, and ſtamped on it like one poſſeſſed, while his attendants paid the ſame compliments to all the poor monks. The people enraged at his unprieſtly conduct would have torn him to pieces; when he retired to Lambeth, and, by way of expiation, rebuilt it with great magnificence. At a ſubſequent period it was very highly improved by the munificent Henry Chichely, who enjoyed the primacy from 1414 to 1443. I lament to find ſo worthy a man to have been the founder of a building ſo reproachful to his memory as the Lollards tower, at the expence of near 280l. Neither Proteſtants or Catholics ſhould omit viſiting this tower, the cruel priſon of the unhappy followers of Wickliffe. The vaſt ſtaples and rings to which they were chained before they were brought to the ſtake, ought to make Proteſtants bleſs the hour which freed them from ſo bloody a religion." During the civil wars of the laſt century, this palace ſuffered greatly; but at the Reſtoration, the whole was repaired by Archbiſhop Juxton.

110 and Church. The pariſh church of Lambeth (H), which is at a ſmall diſtance from the palace, has a plain tower; and the architecture is of the Gothic of the time of Edward IV. It has very little remarkable in it, except the figure of a pedlar and his dog, painted in one of the windows; and tradition ſays, that the pariſh was obliged to this man for the bequeſt of a piece of land, which bears the name of the *Pedlar's Acre*. In the churchyard is the tomb of old Tradeſcant. Both father and ſon were great travellers; and the former is ſuppoſed to have viſited Ruſſia and moſt parts of Europe, Turkey, Greece, many of the eaſtern countries, Egypt, and Barbary; out of which he introduced multitudes of plants and flowers, unknown before in our gardens. The monument is an altar tomb; embelliſhed with emblematical ſculptures; and bearing the following inſcription, which is both ſingular and hiſtorical:

> Know, ſtranger, ere thou paſs, beneath this ſtone
> Lye John Tradeſcant, grandſire, father, ſon;
> The laſt dy'd in his ſpring; the other two
> Liv'd till they had travell'd Art and Nature through,
> As by their choice collections may appear,
> Of what is rare, in land, in ſea, in air;
> Whilſt they (as Homer's Iliad in a nut)
> A world of wonders in one cloſet ſhut:
> Theſe famous Antiquarians, that had been
> Both gardeners to the Roſe and Lily Queen,
> Tranſplanted now themſelves, ſleep here; and when
> Angels ſhall with their trumpets waken men,
> And fire ſhall purge the world, theſe hence ſhall riſe,
> And change this garden for a paradiſe.

111 Lambeth Marſh. From Lambeth, eaſtward along the river ſide, was once a long tract of dreary marſh, and ſtill in parts called *Lambeth Marſh;* about the year 1560, there was not a houſe on it from Lambeth palace as far as Southwark. 112 Great Manufactories. In a ſtreet called *Narrow-wall* (from one of the ancient embankments) is Mrs Conde's noted manufactory of artificial ſtone (I): And at a ſmall diſtance, Meſſ. Beaufoy's (K) great work

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(H) In deſcribing this church, Mr Pennant takes occaſion to mention the ſad example of fallen majeſty in the perſon of Mary d'Eſte, the unhappy queen of James II.; who, flying with her infant prince from the ruin impending over their houſe, after croſſing the Thames from the abdicated Whitehall, took ſhelter beneath the ancient walls of this church a whole hour, from the rain of the inclement night of December 6. 1688. Here ſhe waited with aggravated miſery, till a common coach, procured from the next inn, arrived, and conveyed her to Graveſend, from whence ſhe ſailed, and bade an eternal adieu to theſe kingdoms.

(I) Her repoſitory conſiſts of ſeveral very large rooms filled with every ornament, which can be uſed in architecture. The ſtatue, the vaſe, the urn, the rich chimney pieces, and in a few words, every thing which could be produced out of natural ſtone or marble by the moſt elegant chiſel, is here to be obtained at an eaſy rate.

(K) "Where (ſays Mr Pennant) the foreign wines are moſt admirably mimicked. Such is the prodigality and luxury of the age, that the demand for many ſorts exceeds in a great degree the produce of the native vineyards. We have ſkilful fabricators, who kindly ſupply our wants. It has been eſtimated, that half of the port, and five ſixths of the white wines conſumed in our capital, have been the produce of our home wine preſſes. The product of duty to the ſtate from a ſingle houſe was in one year, from July 5. 1785 to July 5. 1786, not leſs than 7363l. 9s. 8½d. The genial banks of the Thames oppoſite to our capital, yield almoſt every ſpecies of white wine; and, by a wondrous magic, Meſſ. Beaufoy pour forth the materials for the rich Frontiniac, work for making wines, and that for making vinegar (L).

This ground, ſo profitable to the proprietors, and ſo productive of revenue to the ſtate, was within memory the ſcene of low diſſipation. Here ſtood Cuper's garden, noted for its fireworks, and the great reſort of the profligate of both ſexes. This place was ornamented with ſeveral of the mutilated ſtatues belonging to Thomas earl of Arundel, which had been for that purpoſe begged from his lordſhip by one Boyder Cuper, a gardener in the family. The great timber yards beneath which theſe antiquities were found, are very well worthy of a viſit. One would fear that the foreſts of Norway and the Baltic would be exhauſted, to ſupply the wants of our overgrown capital, were we not aſſured that the reſources will ſucceſſively be increaſed equal to the demand of ſucceeding ages.—In this pariſh are alſo vaſt diſtilleries, formerly the property of Sir Joſeph Mawbey; where are ſeldom leſs than 2000 hogs, which are fed entirely on grains.

113 City and iberties of eſtmin-er.

III. *City and Liberties of* W*ESTMINSTER*. The city of Weſtminſter derives its name from a *minſter*, or abbey, and *weſt*, on account of its ſituation with reſpect to St Paul's cathedral, which was formerly called *Eaſtminſter*. In ancient times this diſtrict ſtood upwards of a mile from the city of London, and contained only two pariſhes, which were thoſe of St Margaret and St John, with two chapels of eaſe; but at preſent it has ſeven other parochial churches, viz. St Clement's Danes, St Paul's Covent garden, St Mary's le Strand, St Martin's in the Field's, St Anne's, St James's, and St George's Hanover-ſquare.

Weſtminſter was anciently called *Thorny Iſland*, from its having been covered with thorn buſhes, and encompaſſed by a branch of the Thames, which is ſaid to have run through the ground now called *St James's Park*, from weſt to eaſt, and to have rejoined the river at Whitehall.

Till the general diſſolution of religious houſes, Weſtminſter was ſubject to the arbitrary rule of its abbot and monks; but in 1541, upon the ſurrender of William Benſon the laſt abbot, Henry VIII. not only turned it into an honour, but created it the ſee of a biſhop, and appointed for a dioceſe the whole county of Middleſex, except Fulham, which belonged to the biſhop of London. This biſhoprick, however, ſoon after its inſtitution, was diſſolved by Edward VI.

114 Govern-ment of Weſtmin-ſter.

The city of Weſtminſter is governed by a high ſteward, an office of great dignity, who is uſually one of the firſt peers in the realm; and is choſen for life by the dean and chapter of the collegiate church of St Peter. There is alſo a deputy ſteward and a high bailiff, who alſo hold their offices for life; being nominated by the dean and chapter, and confirmed by the high ſteward.

The dean and chapter are inveſted with an eccleſiaſtical and civil juriſdiction within the liberties of Weſtminſter, St Martin's le Grand, near Cheapſide, in the city of London, and ſome towns in Eſſex, which are exempted from the juriſdiction of the biſhop of London and the archbiſhop of Canterbury.

115 Churches.

St Margaret's Church was founded by Edward the Confeſſor, ſince which time it has been frequently rebuilt. In the eaſt end of this church is a window curiouſly painted, with the hiſtory of the crucifixion, and with the figures of ſeveral apoſtles and ſaints finely executed. It formerly belonged to a private chapel at Copt-hall, near Epping in Eſſex, and was purchaſed by the officers of this pariſh, ſome years ago for 400 guineas. In this church the houſe of commons attends divine ſervice on ſtate holidays.

The *church of St John the Evangeliſt* was erected in 1728, and having ſunk conſiderably whilſt it was building, occaſioned an alteration of the plan. On the north and ſouth ſides are magnificent porticoes, ſupported by vaſt ſtone pillars, as is alſo the roof of the church; at each of the four corners is a beautiful ſtone tower and pinnacle, which were added with the view of making the whole ſtructure ſink equally. The parts of this building are held together by iron bars, which run acroſs even the aiſles.

116 Weſtmin-ſter Abbey, and its Chapels.

The moſt remarkable ſtructure in Weſtminſter is the *abbey-church of St Peter*. On its ſite ſtood once a temple of Apollo, which according to tradition was thrown down by an earthquake in the time of Antoninus Pius; and from the ruins of which Sebert king of the Weſt Saxons raiſed a Chriſtian church, which was ruined by the Danes. It was repaired by Edward the Confeſſor, and given to a few monks; and this ſpot he choſe for his burial-place. Henry III. 160 years after, took down this fabric of Edward's, and erected a new church, which was 50 years in building. It ſuffered much by fire in 1274, but was repaired by Edward I. Edward II. and the abbots. In 1700 this church being much decayed, the parliament granted money for repairing it, and has frequently repeated the bounty ſince that time. The form of the abbey is that of a long croſs:

Frontiniac. to the more elegant tables; the Madeira, the Calcavella, and the Liſbon, into every part of the kingdom."

(L) "There is a magnificence of buſineſs (our author remarks) in this ocean of ſweets and ſours that cannot fail exciting the greateſt admiration; whether we conſider the number of veſſels or their ſize. The boaſted tun at Heidelberg does not ſurpaſs them. On firſt entering the yard, two riſe before you, covered at the top with a thatched dome; between them is a circular turret, including a winding ſtaircaſe, which brings you to their ſummits, which are above 24 feet in diameter. One of theſe conſervatories is full of ſweet wine, and contains 58,109 gallons, or 1815 barrels of Wincheſter meaſure. Its ſuperb aſſociate is full of vinegar, to the amount of 56,799 gallons, or 1774 barrels of the ſame ſtandard as the former. The famous German veſſel yields even to the laſt by the quantity of 40 barrels.—Beſides theſe, is an avenue of leſſer veſſels, which hold from 32,500 to 16,974 gallons each. After quitting this Brobdignagian ſcene, we paſs to the acres covered with common barrels: we cannot diminiſh our ideas ſo ſuddenly, but at firſt we imagine we could quaff them off as eaſily as Gulliver did the little hogſheads of the kingdom of Lilliput."

croſs : its greateſt length is 489 feet, and the breadth of the weſt front 66 feet ; the length of the croſs aiſle is 189 feet, and the height of the roof 92 feet. At the weſt end are two towers : the nave and croſs aiſle are ſupported by 50 ſlender pillars of Suſſex marble, excluſive of pilaſters. In the upper and lower ranges there are 94 windows, all which, with the arches, roofs, and doors, are in the Gothic taſte. The inſide of this church is much better executed than the outſide : and the perſpective is good, particularly that of the grand aiſle. The choir, from which there is an aſcent by ſeveral ſteps to a fine altar-piece, is paved with black and white marble ; having 28 ſtalls on the north, the ſame number on the ſouth, and eight at the weſt end. The altar is made of a beautiful piece of marble, the gift of Queen Anne, encloſed by a curious baluſtrade, and upon a pavement of porphyry, jaſper, Lydian, and ſerpentine ſtones, laid in the moſaic ſtyle, at the expence of Abbot Ware, A. D. 1272 ; and is ſaid to be one of the moſt beautiful of its kind in the world. On each ſide of this altar a door opens into St Edward's chapel ; round which are 10 other chapels, ranging from the north to the ſouth croſs aiſles, and are dedicated, 1. To St Andrew. 2. To St Michael. 3. To St John Evangeliſt. 4. Iſlip's chapel. 5. To St John Baptiſt. 6. To St Paul. 7. Henry V.'s chapel. 8. To St Nicholas. 9. To St Edmund. 10. To St Benedict.

In St Edward's chapel are ſtill to be ſeen the remains of his ſhrine ; which, though now in obſcurity, and robbed of all its riches and luſtre, was once eſteemed the glory of England, ſo far as art and riches could make it. Here are the tombs of King Edward I. and ſeveral other kings and queens of England ; and here alſo is ſhown the famous chair in which the kings of Scotland uſed to be crowned at Scoone. Henry V.'s chapel is divided from St Edward's by an iron ſcreen, on each ſide of which are ſtatues as big as life.—St Andrew's chapel, which is next the north croſs, and the others which ſurround the choir, are crowded with the monuments of noble perſonages, worthy the attention of the curious.—At the corner of St Benedict's chapel, an iron gate opens into the ſouth croſs aiſle ; which from the number of monuments erected therein to celebrated Engliſh poets, has obtained the name of the *Poets corner :* though here we find a moſt magnificent monument erected at the ſouth end in memory of the late John duke of Argyle and Greenwich ; another to William Camden the antiquarian ; and others to the celebrated divine Dr Iſaac Barrow, to Thomas Parr who died at the age of 152 years, &c.—The ſouth aiſle is adorned with 19 curious monuments of the pious, the brave, and the learned ; and turning northward from the weſt door, we view a great number more.

117 Henry VII.'s chapel.

On the eaſt of the abbey, and which, though ſeparate from the other chapels in the choir, ſeems to be one and the ſame building with the abbey, ſtands the chapel of King Henry VII. which that king founded in the year 1502, and was at that time ſtyled the *wonder of the world*, and is now one of the moſt expenſive remains of the ancient Engliſh taſte and magnificence. There is no looking upon it without admiration : it conveys an idea of the fine taſte of Gothic architecture in that age ; and the inſide is ſo noble, majeſtic, and of ſuch curious workmanſhip, that it would take a volume to deſcribe each part with juſtice and propriety.

Its original intention was to be a dormitory for the royal blood : and ſo far the will of the founder has been obſerved, that none have been interred therein but ſuch as have traced their deſcent from ancient kings. The tomb of King Henry VII. is moſt magnificent, encloſed with a ſcreen of caſt braſs, moſt admirably deſigned, and as well executed. Within the rails are the figures of that king and his royal conſort, in their robes of ſtate, on a tomb of black marble : and at the head of this tomb lie the remains of Edward VI. In different parts of this chapel are the monuments of Lewis Stuart duke of Richmond, George Villars duke of Buckingham, John Sheffield duke of Buckingham, Charles Montague marquis of Halifax, Edward V. and his brother Richard ; the vault of James I. and his queen Anne and daughter Mary, on which is a ſmall tomb adorned with the figure of a child ; a lofty monument of Queen Elizabeth, and another of Mary queen of Scots ; the monuments for Margaret Douglas daughter of Margaret queen of Scots, Margaret counteſs of Richmond mother to Henry VII. the vault of King Charles II. and William III. Queen Mary his conſort, Queen Anne, and Prince George. Over theſe royal perſonages are their effigies (except that of Prince George) in wainſcot preſſes, made of wax to reſemble life, and dreſſed in their coronation robes. And at the corner of the great eaſt window, in another wainſcot preſs, ſtands the effigy of Mary ducheſs of Richmond, daughter to James duke of Richmond and Lenox, dreſſed in the very robes ſhe wore at the coronation of Queen Anne. On leaving the aiſle, you are ſhown another preſs, containing the effigy of General Monk, who, on account of his loyalty, and the part he took in the reſtoration of King Charles II. had a vault appropriated to him and his family amongſt the royal blood.

In a fine vault under Henry the VII.'s chapel, is the burying place of the preſent royal family, erected by his late majeſty King George II. Adjoining to the abbey are the cloiſters, built in a quadrangular form, with piazzas towards the court, where ſeveral of the prebendaries have their houſes.

118 Weſtminſter School

Near the abbey church is the King's ſchool, uſually called *Weſtminſter ſchool*. It was originally founded in 1070, and a ſecond time by Queen Elizabeth in 1560, whence it is ſometimes called the *Queen's College ;* and is at preſent one of the greateſt ſchools in the kingdom. The learned antiquary Mr Camden was once maſter of it, and Ben Johnſon one of his ſcholars. Dr Buſby, who was maſter upwards of 50 years, greatly contributed to keep up its reputation, formed its muſeum, and improved both the maſter's and his prebendal houſe.—This ſchool, inſtead of one maſter and one uſher as at firſt, has now an upper and under maſter, and five uſhers, who have about 400 youths under their tuition. A plan was ſet on foot when the preſent archbiſhop of York was maſter, for building a college for the uſe of the ſtudents, but this did not ſucceed.

119 Weſtminſter-hall.

On the north-eaſt ſide of the abbey is an old Gothic building called *Weſtminſter-hall*, firſt built by William Rufus as an addition to a royal palace, and afterwards rebuilt by Richard II. in the year 1397. It is reckoned one of the largeſt rooms in Europe, being 270 feet long, 70 broad, and 90 high, ſupported only by buttreſſes. The roof is of timber, and was ſome years ago ſlated, the old covering of lead being reckoned too heavy. It is paved with ſtone. In this ſpacious room the kings of England have generally held their coronation and other ſolemn feaſts; and it is uſed for the trial of peers. Since the reign of Henry III. the three great courts of Chancery, King's Bench, and Common Pleas, have been held in ſeparate apartments of this hall; and the court of Exchequer above ſtairs.

120 Houſe of Commons. Adjoining to the ſouth-eaſt angle of Weſtminſter-hall is a building formerly called *St Stephen's Chapel*, from its having been dedicated to that ſaint. It was founded by King Stephen; and in 1347 was rebuilt by King Edward III. who converted it to a collegiate church; but ſince it was ſurrendered to Edward VI. it has been uſed for the aſſembly of the repreſentatives of the commons of England, and is now generally called the *Houſe of Commons*. The benches, which aſcend behind one another as in a theatre, are covered with green cloth; the floor is matted; and round the room are wainſcot galleries, ſupported by cantilevers adorned with carved work, in which ſtrangers are often permitted to ſit and hear the debates.

121 Houſe of Lords. On the ſouth ſide of the hall is the *Houſe of Lords*, ſo called from being the place where the peers of Great Britain aſſemble in parliament. It is an oblong room, not quite ſo large as the houſe of commons; and is hung with fine old tapeſtry, repreſenting the defeat of the Spaniſh Armada in 1588. The deſign was drawn by Cornelius Vroom, and the tapeſtry executed by Francis Spiering. It was not put up till the year 1650, two years after the extinction of monarchy, when the houſe of lords was uſed as a committee room for the houſe of commons. The heads of the naval heroes who commanded on the glorious day form a matchleſs border round the work, animating poſterity to emulate their illuſtrious example. Here is a throne for the king, with ſeats on the right and left for ſuch peers of the realm as are of the blood royal. Before the throne are three broad ſeats; on the firſt of which, next the throne, ſits the lord chancellor, or keeper of the great ſeal, who is ſpeaker of the houſe of peers; and on the other two ſit the judges, the maſter of the rolls, or the maſters in chancery, who attend occaſionally to give their opinions on points of law. The two archbiſhops ſit at ſome diſtance from the throne on the right hand, and the other biſhops in a row under them. All the benches are covered with red cloth ſtuffed with wool. Here likewiſe, by an order of the houſe, a gallery for ſtrangers has been erected.

122 Prince's Chamber, &c. Adjoining to the houſe of lords is the *Prince's Chamber*, where the king is robed when he comes to the parliament. On the other ſide is the *Painted Chamber*, which is ſaid to have been Edward the Confeſſor's bedchamber, and the room in which the parliaments were anciently opened. Here conferences are often held between the two houſes, or their committees. Contiguous to thoſe is an apartment called the *Court of Requeſts*, where ſuch as have buſineſs in either houſe may attend.

Near theſe buildings is a bridge over the Thames, called *Weſtminſter Bridge*, accounted one of the moſt complete and elegant ſtructures of the kind in the known world. It is built entirely of ſtone, and extends over the river at a place where it is 1223 feet broad: which is above 380 feet broader than at London bridge. On each ſide is a fine baluſtrade of ſtone, with places of ſhelter from the rain. The width of the bridge is 44 feet, having on each ſide a fine foot way for paſſengers. It conſiſts of 14 piers, and 13 large and two ſmall arches, all ſemicircular, that in the centre being 76 feet wide, and the reſt decreaſing four feet each from the other, ſo that the two leaſt arches of the 13 great ones are each 52 feet. It is computed that the value of 40,000l. in ſtone and other materials is always under water. This magnificent ſtructure was begun in 1739, and finiſhed in 1750, at the expence of 389,000l. defrayed by the parliament. It was built after the deſign of M. Labelye, an ingenious architect, a native of France. 123 Weſtminſter-bridge.

124 Whitehall. On the bank of the Thames, at the eaſt confines of St Margaret's pariſh, was a palace called *Whitehall*, originally built by Hubert de Burgh earl of Kent, before the middle of the 13th century. It afterwards devolved to the archbiſhop of York, whence it received the name of *York Place*, and continued to be the city reſidence of the archbiſhops till it was purchaſed by Henry VIII. of Cardinal Wolſey in 1530. At this period it became the reſidence of the court; but in 1697 was deſtroyed by accidental fire, all except the Banqueting-houſe, which had been added to the palace of Whitehall by James I. according to a deſign of Inigo Jones. This is an elegant and magnificent ſtructure of hewn ſtone, adorned with an upper and lower range of pillars, of the Ionic and Compoſite orders; the capitals are enriched with fruit and foliages, and between the columns of the windows. The roof is covered with lead, and ſurrounded with a baluſtrade. The building chiefly conſiſts of one room of an oblong form 40 feet high, and a proportionable length and breadth. The cieling is painted by the celebrated Sir Peter Paul Rubens. It is now uſed only as a chapel-royal, and the other part of the houſe is occupied with with ſtate offices.

125 Horſe Guards. Oppoſite to the Banqueting-houſe ſtands the *Horſe Guards*, ſo called from being the ſtation where that part of his majeſty's troops uſually do duty. It is a ſtrong building, of hewn ſtone, conſiſting of a centre and two wings. In the former is an arched paſſage into St James's Park; and over it, in the middle, riſes a cupola. In a part of the building is the War Office. Near the Horſe-guards is the *Treaſury*; a large building, which fronts the Parade in St James's park; and where the board of treaſury is kept.

126 Admiralty Office. Eaſtward of the Horſe Guards is the *Admiralty Office*, a large pile, built with brick and ſtone. The front towards Whitehall has two deep wings, and a lofty portico ſupported by four large ſtone pillars. A piazza, conſiſting of beautiful columns, runs almoſt from one end to the other. The wall before the court has been lately built in an elegant manner, and each ſide of the gate is ornamented with naval emblems. Beſides a hall, and other public apartments, here are ſpacious houſes for ſeven commiſſioners of the admiralty.

At a little diſtance from the Admiralty, where three

127 Charing-croſs.

capital ſtreets terminate, is a large opening called *Charing-croſs*, from one of the croſſes which King Edward I. cauſed to be erected in memory of his queen Eleanor, and *Charing* the name of a village in which it was built. The croſs remained till the civil wars in the reign of Charles I. when it was deſtroyed by the fanatics, as a monument of popiſh ſuperſtition; but after the Reſtoration, an equeſtrian ſtatue of Charles I. was ſet up in its ſtead. This, which is of braſs, and finely executed, continues to be an ornament to the place. It was made in 1633, at the expence of the Howard-Arundel family. The parliament ſold it to a brazier in Holborn, with ſtrict orders to break it to pieces; but he concealed it under ground till the Reſtoration, when it was ſet up in 1678.

128 Queen's Palace.

At the weſt end of the Mall, in St James's park, which begins near Charing-croſs, ſtands the *Queen's Palace*. It was originally known by the name of *Arlington Houſe*; but being purchaſed by the late duke of Buckingham's father, who rebuilt it from the ground in 1703, it was called *Buckingham Houſe*, till the year 1762, when it was purchaſed by his majeſty for a royal reſidence. It is built of brick and ſtone, having in the front two ranges of pilaſters of the Corinthian and Tuſcan orders. It has a ſpacious court yard, encloſed with iron rails, fronting St James's park, with offices on each ſide, with two pavilions, ſeparated from the manſion houſe by colonnades of the Tuſcan, Doric, and Ionic orders. His majeſty has here built a fine library, in an octagonal form, beſides ſeveral other additions.

129 St James's.

Eaſtwards of the queen's palace ſtands *St James's*, an old building, which, till the former was purchaſed by the crown, had been the town reſidence of the royal family ſince the burning of Whitehall in 1697. This palace was built by Henry VIII. and obtained its name from an hoſpital which formerly ſtood on the ſpot. It is an irregular building, of a mean appearance without, but contains ſeveral magnificent apartments. Here the court and levees are ſtill kept, and moſt of the perſons belonging to the houſehold have their reſidence. The chapel of the hoſpital was converted to the uſe of the royal family, as it now remains, and is a royal peculiar, exempted from all epiſcopal juriſdiction. 130 The Park and Mall. When this palace was built, it abutted in the ſouth-weſt upon an uncultivated ſwampy tract of ground, which the king encloſed and converted into a park, called from the palace *St James's park*. He alſo laid it out into walks, and collected the water into one body. It was afterwards much enlarged and improved by King Charles II. who planted it with lime trees, and formed a beautiful viſta, near half a mile in length, called the *Mall*, from its being adapted to a play at bowls diſtinguiſhed by that name. He alſo formed the water into a canal 100 feet broad and 2800 feet long; and furniſhed the park with a decoy, and other ponds for water-fowl; but theſe have lately been deſtroyed, on account of the unwholeſome vapours which they excited.

In a line with St James's palace, on the eaſt ſide, is *Marlborough-houſe*, which belongs to the duke of Marlborough, and is a large brick edifice, ornamented with ſtone.

131 The Strand, when firſt formed.

Eaſtward from Charing-croſs, runs that fine ſtreet the *Strand*, which terminates at Temple-bar. In the year 1353 the whole of it was an open high way, with gardens to the water-ſide. In that year it was ſo ruinous, that Edward III. by an ordinance directed a tax to be raiſed upon wool, leather, wine, and goods carried to the ſtaple at Weſtminſter, from Temple-bar to Weſtminſter abbey, for the repair of the road; and that all owners of houſes adjacent to the high way ſhould repair as much as lay before their doors. Before the above period, it entirely cut off Weſtminſter from London; nothing intervened except the ſcattered houſes, and a village which afterwards gave name to the whole; and St Martin's ſtood literally in the fields. But about the year 1560 a ſtreet was formed, looſely built; for all the houſes on the ſouth ſide had great gardens to the river, were called by their owners names, and in after-times gave name to the ſeveral ſtreets that ſucceeded them, pointing down to the Thames; each of them had ſtairs for the conveniency of taking boat, of which many to this day bear the names of the houſes. As the court was for centuries either at the palace of Weſtminſter or Whitehall, a boat was the cuſtomary conveyance of the great to the preſence of their ſovereign. The north ſide was a mere line of houſes from Charing-croſs to Temple-bar; all beyond was country. The gardens which occupied part of the ſite of Covent-garden were bounded by fields, and St Giles's was a diſtant country village. Our capital found itſelf ſo ſecure in the vigorous government of Queen Elizabeth, that, by the year 1600, moſt conſiderable additions were made to the north of the long line of ſtreet juſt deſcribed. St Martin's-lane was built on both ſides. St Giles's church was ſtill inſulated: but Broad-ſtreet and Holborn were completely formed into ſtreets with houſes all the way to Snow-hill. Covent-garden and Lincoln's-inn-fields were built, but in an irregular manner. Drury-lane, Clare-ſtreet, and Long-acre, aroſe in the ſame period.

132 Northumberland Houſe.

Almoſt contiguous to Charing-croſs, and upon the ſouth ſide of the Strand, is that noble palace called *Northumberland Houſe*, which ſtands on the ſite of the hoſpital of St Mary Rounceval. Henry VIII. granted it to Sir Thomas Caverden. It was afterwards transferred to Henry Howard earl of Northampton; who, in the time of James I. built here a houſe, and called it after his own name. He left it to his kinſman the earl of Suffolk, lord treaſurer: and by the marriage of Algernon Percy earl of Northumberland, with Elizabeth daughter of Theophilus earl of Suffolk, it paſſed into the houſe of the preſent noble owner. The greater part of the houſe was built by Bernard Janſen, an architect in the reign of James I. The front next the ſtreet was begun by Algernon in 1748, and finiſhed by the preſent duke, who married his daughter. Two additional wings to the front next the Thames, and a variety of other improvements both in building and furniture, have contributed to render this houſe the largeſt and moſt magnificent in London. It contains a gallery of 106 feet long by 26 wide, moſt ſuperbly furniſhed.

133 Durham Yard.

A ſhort way eaſtward, on the ſame ſide, ſtood *Durham Yard*, which took its name from a palace built originally by the illuſtrious Thomas de Hatfield, elected biſhop of Durham in 1345; deviſed by him for the town reſidence of him and his ſucceſſors. At this place, in ondon.

in 1540, was held a moſt magnificent feaſt, given by the challengers of England, who had cauſed to be proclaimed, in France, Flanders, Scotland, and Spain, a great and triumphant juſting to be holden at Weſtminſter, for all comers that would undertake them. But both the challengers and defendants were Engliſh. After the gallant ſports of each day, the challengers rode into this Durham-houſe where they kept open houſehold, and feaſted the king and queen (Anne of Cleves) with her ladies, and all the court. In the reign of Edward VI. the Mint was eſtabliſhed in this houſe, under the management of Sir William Sharrington, and the influence of the aſpiring Thomas Seymour, lord admiral. Durham-houſe was reckoned one of the royal palaces belonging to Queen Elizabeth; who gave the uſe of it to the great Sir Walter Raleigh.

134 e Adel-

Durham-yard is now filled with a moſt magnificent maſs of building, called the *Adelphi*, in honour of two brothers, the ingenious Adams, its architects. Beſides its fine lodgings, it is celebrated for its enchanting proſpect, the utility of its wharfs, and its ſubterraneous apartments anſwering a variety of purpoſes of general benefit.

135 he Savoy.

Farther on ſtand the ruins of the *Savoy*. Henry III. had granted to Peter of Savoy, uncle to his queen Eleanor, daughter of Berringer of Provence, all the houſes upon the Thames where this building now ſtands, to hold to him and his heirs, yielding yearly at the Exchequer three barbed arrows for all ſervices. This prince founded the Savoy, and beſtowed it on the foreign hoſpital of Montjoy. Queen Eleanor purchaſed it, and beſtowed it on her ſon Edmund earl of Lancaſter. It was rebuilt in a moſt magnificent manner by his ſon Henry. It was made the place of confinement of John king of France in 1356, after he was taken priſoner at the battle of Poitiers. In 1381 it was entirely deſtroyed by Wat Tyler, out of ſpleen to the great owner John of Gaunt. Henry VII. began to rebuild it, with a deſign of forming it into an hoſpital for a hundred diſtreſſed people, and Henry VIII. completed the deſign. The revenues, at the ſuppreſſion by Edward VI. amounted to above 500l. a-year. Queen Mary reſtored it; and her maids of honour, with exemplary piety, furniſhed it with all neceſſaries. It was again ſuppreſſed by Queen Elizabeth; and at preſent part ſerves as lodgings for private people, for barracks, and a ſcandalous infectious priſon for the ſoldiery and for tranſport-convicts.

136 merſet uſe.

A little to the eaſtward ſtood *Somerſet Houſe*, a palace built by Somerſet the protector in the time of Edward VI.; and to make way for which he demoliſhed a great number of buildings without making any recompenſe to the owners. Part of the church of St John of Jeruſalem and the Tower were blown up for the ſake of the materials; and the cloiſters on the north ſide of St Paul's, with the charnel-houſe and chapel, underwent the ſame fate; the tombs being deſtroyed, and the bones thrown into Finſbury-fields. This happened in 1549; but it is probable that he did not live to inhabit the palace he built, as he was executed in the year 1552. After his death the palace fell to the crown; and it became an occaſional place of reſidence, firſt to Queen Elizabeth, and afterwards to Catherine queen to King Charles II. It was built in a ſtyle of architecture compounded of the Grecian and Gothic; and the back, front, and water gate, were done from a deſign of Inigo Jones, about the year 1623. A chapel was begun the ſame year by that architect, and finiſhed ſome time after. The whole of this ſtructure was demoliſhed in 1775, in conſequence of an act of parliament; and a moſt magnificent edifice, from a deſign by Sir William Chambers, has been erected for the accommodation of all the public offices,—thoſe of the Treaſury, the Secretary of State, the Admiralty, the War, and the Exciſe, excepted. The Royal Society, and the Society of Antiquarians, hold their meetings here, in apartments which have been allotted to them by royal munificence; and here alſo are annually exhibited the works of the Britiſh painters and ſculptors. The terrace on the ſouth ſide is a walk bounded by the Thames, and unparalleled for grandeur and beauty of view.

137 St Martin's and other Churches.

The church of St Martin is diſtinguiſhed by the name of *St Martin's in the Fields*, from its ſituation, which was formerly a field, with only a few ſcattered houſes. The church being decayed, was rebuilt by Henry VIII. and again by James I. but not being large enough to accommodate the inhabitants of the pariſh, it was augmented in 1607, at the charge of Prince Henry, eldeſt ſon of James I. and ſeveral of the nobility. After many expenſive reparations, however, it was entirely taken down in 1720, and a new church begun, which was finiſhed in 1726. This is an elegant edifice, built of ſtone. On the weſt front is a noble portico of Corinthian columns, ſupporting a pediment, in which are repreſented the royal arms in bas relief. The aſcent to the portico is by a flight of very long ſteps. The length of this church is about 140 feet, the breadth 60, and height 45. It has a fine arched roof ſuſtained by ſtone columns of the Corinthian order. The ſteeple has a beautiful ſpire, and one of the beſt rings of bells in London.

St James's Church was built in the reign of Charles II. at the expence of Henry earl of St Alban's, and other neighbouring inhabitants. The building is of brick and ſtone, about 85 feet long, 60 broad, and 45 feet high, with a handſome ſteeple 150 feet in height.

St George's Church, near Hanover-ſquare, is a beautiful ſtructure. This was one of the fifty new churches erected within the reign of Queen Anne. The ground for the edifice was given by the late Lieutenant-general Stewart, who alſo left 4000l. to the pariſh, towards erecting and endowing a charity ſchool; which, by additional benefactions and ſubſcriptions, is become very conſiderable.

138 Covent Garden.

The greater part of the pariſh of *St Paul's Covent-garden*, was anciently a garden, belonging to the abbot and convent of Weſtminſter, and was then called *Convent-garden*, a name corrupted into Covent, and more generally Common-garden. In 1552, Edward VI. gave it to the earl of Bedford, with an adjoining field, formerly called the *Seven Acres*, but now, being turned into a long ſtreet, called *Long-acre*. The church of St Paul's, Covent-garden, was built by Inigo Jones, and was eſteemed one of the moſt ſimple and perfect pieces of architecture in England. It was burnt by accident a few years ago; but has ſince been rebuilt in a very plain ſtile. In the area before the church, of about three acres of ground, is *Covent garden market*, which is the beſt in England for herbs, fruit, and flowers. On the north, and part of the eaſt ſide, is a magnificent piazza, deſigned by Inigo Jones.

139 St Mary le Strand, &c.

Next to the pariſh of St Paul, Covent-garden, is that of *St Mary le Strand*. This is alſo one of the fifty new churches built in the reign of Queen Anne, and is a handſome piece of architecture, though not very extenſive. At the entrance, on the weſt ſide, is an aſcent by a flight of ſteps, in a circular form, which leads to a ſimilarly ſhaped portico of Ionic columns, covered with a dome, that is crowned with a vaſe. The columns are continued along the body of the church, with pilaſters of the ſame order at the corners; and in the intercolumniations are niches handſomely ornamented. Over the dome is a pediment ſupported by Corinthian columns, which are alſo continued round the body of the ſtructure, over thoſe of the Ionic order. A handſome baluſtrade is carried round the top of the church, and adorned with vaſes.

A little eaſtward from the preceding church is that of *St Clement's Danes*, ſituated likewiſe in the Strand. A church is ſaid to have ſtood in this place ſince about the year 700; but the preſent ſtructure was begun in 1680, deſigned by Sir Chriſtopher Wren. It is built of ſtone, with two rows of windows, the lower plain, but the upper ornamented; and the termination is by an attic, the pilaſters of which are covered with vaſes. On the ſouth ſide is a portico, covered with a dome ſupported by Ionic columns; and oppoſite to this is another. The ſteeple is beautiful, and of a great height.

The *church of St George*, Bloomſbury, is alſo one of the fifty new churches erected by act of parliament. It is diſtinguiſhed from all the reſt by ſtanding ſouth and north, and by the ſtatue of King George I. at the top of its pyramidal ſteeple.

140 Foundling and other Hoſpitals.

In Lamb's Conduit-fields, on the north ſide of the town, is a large and commodious ſtructure called the *Foundling Hoſpital*, for the reception of expoſed and deſerted children. This laudable charity was projected by ſeveral eminent merchants in the reign of Queen Anne; but was not carried into execution till many years afterwards, when a charter for its eſtabliſhment was obtained, through the indefatigable aſſiduity of Mr Thomas Coram, the commander of a merchant veſſel, who ſpent the remainder of his life in promoting this deſign. From the time of its inſtitution, the parliament has occaſionally granted conſiderable ſums for its ſupport; and in ſome years upwards of 6000 infants have been received.

Not far from hence is an *Hoſpital for the Smallpox*; and in different parts of the town there are others, either for the ſick of all kinds, or thoſe in particular circumſtances. Of the latter are ſeveral *Lying-in hoſpitals*, and the *Lock Hoſpital* for female patients in the venereal diſeaſe. Of the former are *St George's* and *Middleſex Hoſpitals*, beſides ſeveral infirmaries.

141 Gray's Inn.

Gray's Inn is one of the four principal inns of court; which, though ſituated within the limits of the pariſh of St Andrew, Holborn, is yet without the liberties of the city of London. It took its name from an ancient family of the name of Gray, which formerly reſided here, and in the reign of Edward III. demiſed it to ſome ſtudents in the law; but it is ſaid to have been afterwards conveyed to the monks of Shene, near Richmond in Surry, who leaſed it to the ſociety of the Inn. It was held by this tenure till the diſſolution of the monaſteries, when Henry VIII. granted it to the ſociety in fee-farm. This inn conſiſts chiefly of two quadrangles, and has an old hall well built of timber, with a chapel in the Gothic ſtyle. Here is alſo a good library, and the inn is accommodated with a ſpacious garden.

142 Lincoln's Inn.

Lincoln's Inn, another of the four principal inns of court, was originally the palace of Ralph Neville biſhop of Chicheſter, and chancellor of England about the year 1226. It afterwards devolved to the earl of Lincoln, who converted it into a court for the ſtudents of law about the year 1310. From him it received the name of *Lincoln's Inn*, and conſiſted only of what is now called the old ſquare, which is entered from Chancery-lane. At preſent this ſquare contains, beſides buildings for the lawyers, a large hall where the lord chancellor hears cauſes in the ſittings after term. To this inn belongs likewiſe a fine garden, which has lately been diminiſhed by the building of ſome large and commodious offices, for the uſe of the ſix clerks in the court of chancery, &c.

143 Charter houſe.

In the pariſh of St James, Clerkenwell, is an hoſpital called the *Charter-houſe*, which is a corruption of the word *chartreux*, a name formerly uſed for a convent or priory of the Carthuſians, which this place formerly was. After the diſſolution of monaſteries it fell to the earl of Suffolk, who diſpoſed of it to Thomas Sutton, Eſq. a citizen of London, in the time of King James I. for 13,000l. The purchaſer intending it for an hoſpital, applied to the king for a patent, which he obtained in 1611, and the grant was confirmed by parliament in 1623. Mr Sutton having expended 7000l. in fitting up the buildings, gave it the name of *King James's Hoſpital*, and endowed it with lands to the amount of near 4500l. a-year, for the maintenance of 80 gentlemen, merchants or ſoldiers, who ſhould be reduced to indigent circumſtances; and 40 boys, to be inſtructed in claſſical learning. The men are provided with handſome apartments, and all the neceſſaries of life except clothes; inſtead of which each of them is allowed a gown, and 7l. a-year. Of the boys, 29 are at a proper time ſent to the univerſity, where each has an allowance of 20l. a-year for eight years. Others, who are judged more fit for trade, are put out apprentices, and the ſum of 40l. is given with each of them. As a farther encouragement to the ſcholars, there are nine eccleſiaſtical preferments in the gift of the governors. It is alſo by the recommendation of the latter that all penſioners and youths are received into the hoſpital. They conſiſt of 16, of which number the king is always one, and the others are generally noblemen of the firſt rank. To this hoſpital belong a maſter, a preacher, two ſchoolmaſters, a phyſician, a regiſter, a receiver, a treaſurer, a ſteward, an auditor, and other officers; and the annual revenues of it being now increaſed to upwards of 6000l. five men and four boys have been added to the original number.

144 Aſke's Hoſpital.

In the pariſh of St Luke ſtands the Haberdaſhers alms-houſe, or *Aſke's Hoſpital*, ſo called from having been erected by the company of haberdaſhers, purſuant to the will of Robert Aſke, Eſq; one of their members,

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bers, who left 30,000l. for the building and the relief of 20 poor members of the company; beſides the maintenance and education of 20 boys, ſons of decayed freemen of the ſame company. This is a large edifice of brick and ſtone, 400 feet long, with a piazza in front 340 feet in length, conſiſting of ſtone columns of the Tuſcan order. In the middle of the building is a chapel, adorned with columns, entablatures and pediment, of the Ionic order; under the pediment is a niche with a ſtatue of the founder. In the ſame pariſh is the Ironmongers hoſpital, likewiſe a large building.

In the pariſh of St Mary, Whitechapel, ſtands the *London Hoſpital*, for the reception of the ſick. It is a large building, and was erected a few years ſince by voluntary contribution. Here are alſo ſome conſiderable alms-houſes.

145 Houſes of he nobility.

Within the precincts of Weſtminſter are ſeveral ſtately houſes belonging to the nobility, ſome of which have been already mentioned. Of the others, the moſt remarkable at preſent are, Burlington-houſe, Devonſhire-houſe, Egremont-houſe, and Bedford-houſe; Carleton-houſe, the magnificent abode of the prince of Wales; and the ſuperb reſidence erected by the duke of York between the Treaſury and the Horſe-guards.

146 Britiſh Muſeum.

To theſe may be added, *Montagu-houſe* (now the Britiſh Muſeum); which was built on a French plan by the firſt duke of Montagu, who had been ambaſſador in France. The ſtaircaſe and ceilings were painted by Rouſſeau and La Foſſe: the apotheoſis of Iris, and the aſſembly of the gods, are by the laſt. It was purchaſed of the duke's heirs by parliament, for uniting together the Royal, Cottonian, Harleian, Sloanian, and other collections of books, MSS. coins, antiquities, ſubjects in natural hiſtory, &c. &c. for the public uſe, for which it is excellently adapted. The firſt of theſe libraries contains the books and MS8. of our princes from Henry VII. to Charles II.; the ſecond the MSS. collected by Sir John Cotton, his ſon, and grandſon Sir John, which laſt gave it to the public by act 12 and 13 William III. c. 7. The Harleian collection of MSS. was formed by Edward earl of Oxford, and purchaſed by government in 1753, at the ſame time with the library, MSS. and natural curioſities, of Sir Hans Sloane. This laſt coſt, Sir Hans 50,000l.; and he left it by will, to the uſe of the public, on condition that the parliament would pay 20,000l. to his executors. It comprehends an amazing number of curioſities: among which are, the library, including books of drawings, MSS. and prints, amounting to about 50,000 volumes; medals and coins, ancient and modern, 20,000; cameos and intaglios, about 700; ſeals, 268; veſſels, &c. of agate, jaſper, &c. 542; antiquities, 1125; precious ſtones, agates, jaſper, &c. 2256; metals, minerals, ores, &c. 2725; cryſtal, ſpars, &c, 1864; foſſils, flints, ſtones, 1275; earths, ſands, ſalts, 1035; bitumens, ſulphurs, ambers, &c. 399; talcs, micæ, &c. 388; corals, ſponges, &c. 1421; teſtacea, or ſhells, &c. 5843; echini, echinitæ, &c. 659; aſteriæ, trochi, entrochi, &c. 241; cruſtaceæ, crabs, lobſters, &c. 563; ſtellæ marinæ, ſtar-fiſhes, &c. 173; fiſh, and their parts, &c. 1555; birds, and their parts, eggs, and neſts of different ſpecies, 1172; quadrupeds, &c. 1886; vipers, ſerpents, &c. 521; inſects, &c. 5439; vegetables, 12,506; hortus ſiccus or volumes of dried plants, 334; humani, as calculi, anatomical preparations, 756; miſcellaneous things, natural, 2098; mathematical inſtruments, 55. A catalogue of all the above is written in a number of large volumes. It is a large and magnificent building; and has behind it a garden, conſiſting nearly of nine acres.

The Britiſh Muſeum has of late been very much enriched by an acceſſion of Egyptian curioſities, chiefly taken from General Menou at Alexandria. In the mean time they are laid in the court-yard, but will ſoon be depoſited in a building which is to be erected for that partiular purpoſe.

147 Principal ſquares, &c.

Beſides a great number of ſpacious ſtreets, which are daily increaſing, this part of the metropolis is ornamented with ſeveral magnificent ſquares, viz. Groſvenor-ſquare, Berkeley-ſquare, Portman-ſquare, Cavendiſh-ſquare, Hanover-ſquare, St James's-ſquare, Soho-ſquare, Bloomſbury-ſquare, Queen's-ſquare, Lincoln's Inn-Fields, Leiceſter-ſquare, Red-Lion-ſquare, ſome of which have been particularly deſcribed; not to mention others that are at preſent building. In general, the new buildings in the liberty of Weſtminſter have increaſed to a prodigious degree; inſomuch that they reach as far as Marybone to the north, Piccadilly to the ſouth, and Hyde-Park wall to the weſt.

148 London anciently inconvenient and unhealthy.

Before the conflagration in 1666, London (which like moſt other great cities, had ariſen from ſmall beginnings) was totally inelegant, inconvenient, and unhealthy, of which latter misfortune many melancholy proofs are authenticated in hiſtory, and which, without doubt, proceeded from the narrowneſs of the ſtreets, and the unaccountable projections of the buildings, that confined the putrid air, and joined with other circumſtances, ſuch as the want of water, rendered the city ſeldom free from peſtilential devaſtation. The fire which conſumed the greateſt part of the city, dreadful as it was to the inhabitants at that time, was productive of conſequences which made ample amends for the loſſes ſuſtained by individuals; a new city aroſe on the ruins of the old; but, though more regular, open, convenient, and healthful, than the former, yet it by no means anſwered to the characters of magnificence or elegance, in many particulars; and it is ever to be lamented (ſuch was the infatuation of thoſe times), that the magnificent, elegant, and uſeful plan of the great Sir Chriſtopher Wren, was totally diſregarded, and ſacrificed to the mean and ſelfiſh views of private property; views which did irreparable injury to the citizens themſelves and to the nation in general: for had that great architect's plan been followed, what has often been aſſerted muſt have been the reſult; the metropolis of this kingdom would inconteſtably have been the moſt magnificent and elegant city in the univerſe; and of conſequence muſt, from the prodigious reſort of foreigners of diſtinction and taſte who would have viſited it, have become an inexhauſtible fund of riches to this nation. But as the deplorable blindneſs of that age has deprived us of ſo valuable an acquiſition, it is become abſolutely neceſſary that ſome efforts ſhould be made to render the preſent plan in a greater degree anſwerable to the character of the richeſt and moſt powerful people in the world.

149 Its plan ſtill defective.

The plan of London, in its preſent ſtate, will in many inſtances appear to very moderate judges to be

London.

as injudicious a diſpoſition as can eaſily be conceived for a city of trade and commerce, on the borders of ſo noble a river as the Thames. The wharfs and quays on its banks are extremely mean and inconvenient; and the want of regularity and uniformity in the ſtreets of the city of London, and the mean avenues to many parts of it, are alſo circumſtances that greatly leſſen the grandeur of its appearance. Many of the churches and other public buildings are likewiſe thruſt up in corners, in ſuch a manner as might tempt foreigners to believe that they were deſigned to be concealed. The improvements of the city of London for ſome years paſt have, however, been very great; and the new ſtreets, which are numerous, are in general more ſpacious, and built with greater regularity and elegance.

150
Great improvements.

The very elegant and neceſſary method of paving and enlightening the ſtreets is alſo felt in the moſt ſenſible manner by all ranks and degrees of people The roads are continued for ſeveral miles around upon the ſame model; and, excluſive of lamps regularly placed on each ſide, at ſhort diſtances, are rendered more ſecure by watchmen ſtationed within call of each other. Nothing can appear more brilliant than thoſe lights when viewed at a diſtance, eſpecially where the roads run acroſs; and even the principal ſtreets, ſuch as Pall-Mall, New Bond-ſtreet, Oxford-ſtreet, &c. convey an idea of elegance and grandeur.

151
Wealth and grandeur of this vaſt metropolis.

London, then, in its large ſenſe, including Weſtminſter, Southwark, and part of Middleſex, forms one great metropolis, of vaſt extent and of prodigious wealth. When conſidered with all its advantages, it is now what ancient Rome once was; the ſeat of liberty, the encourager of arts, and the admiration of the whole world. It is the centre of trade; has an intimate connexion with all the counties in the kingdom; and is the grand mart of the nation, to which all parts ſend their commodities, from whence they are again ſent back into every town in the nation and to every part of the world. From hence innumerable carriages by land and water are conſtantly employed: and from hence ariſes that circulation in the national body which renders every part healthful, vigorous, and in a proſperous condition; a circulation that is equally beneficial to the head and the moſt diſtant members. Merchants are here as rich as noblemen; witneſs their incredible loans to government: and there is no place in the world where the ſhops of tradeſmen make ſuch a noble and elegant appearance, or are better ſtocked.

152
[illegible]

The Thames, on the banks of which London is ſituated, is a river which, though not the largeſt, is the richeſt and moſt commodious for commerce of any in the world. It is continually filled with fleets, ſailing to or from the moſt diſtant climates; and its banks, from London-bridge to Blackwall, form almoſt one continued great magazine of naval ſtores; containing numerous wet docks, dry docks, and yards for the building of ſhips, for the uſe of the merchants; beſides the places alloted for the building of boats and lighters, and the king's yards lower down the river for the building of men of war.

The Weſt India Docks are deſigned to receive all the ſhips trading to the Weſt Indies, and will, when finiſhed, juſtly claim a place among the curioſities of Great Britain. By virtue of an act of parliament they were undertaken in 1799, the entrances into which are by Blackwall and Limehouſe-hole. The proprietors began with a capital of 500,000l. with parliamentary authority to increaſe it to 600,000l. if they ſhould find it requiſite, and they are to be indemnified by a tonnage of 6s. upon the burden of every ſhip entering the dock.

The docks at Wapping muſt be allowed to be an important improvement. The prodigious one which goes by the name of St George's dock, is capable of containing 200 ſhips, and Shadwell dock will contain about 50 veſſels. The company projecting and carrying theſe into execution, poſſeſs a capital of 1,200,000l. and the ſhares bear a premium. The foundation of the entrance baſon was laid on the 26th of June, 1802, and at the ſame time the firſt ſtone of a tobacco warehouſe, which is the largeſt in the world.

As the city is about 60 miles diſtant from the ſea, it enjoys, by means of this beautiful river, all the benefits of navigation, without the danger of being ſurpriſed by foreign fleets, or of being annoyed by the moiſt vapours of the ſea. It riſes regularly from the water ſide, and, extending itſelf on both ſides along its banks, reaches a prodigious length from eaſt to weſt in a kind of amphitheatre towards the north, and is continued for near 20 miles on all ſides, in a ſucceſſion of magnificent villas and populous villages, the country-ſeats of gentlemen and tradeſmen; whither the latter retire for the benefit of freſh air, and to relax their minds from the hurry of buſineſs. The regard paid by the legiſlature to the property of the ſubject, has hitherto prevented any bounds being fixed for its extenſion.

153
Its great extent.

The irregular form of London makes it difficult to aſcertain its extent. However, its length from eaſt to weſt is generally allowed to be above ſeven miles from Hyde-park corner to Poplar; and its breadth in ſome places three, in others two, and in others again not much above half a mile. Hence the circumference of the whole is almoſt 18 miles; or, according to a later meaſurement, the extent of continued buildings is 35 miles two furlongs and 39 roods. But it is much eaſier to form an idea of the large extent of a city ſo irregularly built by the number of the people, who are computed to be near a million; and from the number of edifices devoted to the ſervice of religion.

154
General enumeration of churches, chapels, &

Of theſe, beſide St Paul's cathedral and the collegiate church at Weſtminſter, there are 114 pariſh-churches and 62 chapels, of the eſtabliſhed religion; 17 foreign Proteſtant chapels; 11 chapels belonging to the Germans, Dutch, Danes, &c.; 26 Independent meetings; 34 Preſbyterian meetings; 20 Baptiſt meetings; 11 Popiſh chapels, and meeting-houſes for the uſe of foreign ambaſſadors and people of various ſects; and 6 Jews ſynagogues. So that there are above 300 places devoted to religious worſhip in the compaſs of this vaſt pile of buildings, without reckoning the 21 out-pariſhes uſually included in the bills of mortality, and a great number of Methodiſt tabernacles.

155
Hoſpitals, ſchools, houſes, &

There are alſo in and near this city 100 alms-houſes, about 20 hoſpitals and infirmaries, 3 colleges, 10 public priſons, 15 fleſh-markets; one market for live cattle; two other markets more particularly for herbs; and 23 other markets for corn, coals, hay, &c.; 15 inns of court; 27 public ſquares, beſides thoſe within ſingle buildings, as the Temple. &c. 3 bridges, 55 halls for companies, 8 public ſchools, called free-ſchools; and 131 charity-ſchools, which provide education for 5034 poor children; 207 inns, 447 taverns, 551 coffeehouſes, 5975 alehouſes; 1000 hackney-coaches; 400 ditto chairs; 7000 ſtreets, lanes, courts, and alleys, and 150,000 dwelling-houſes, containing, as has been already obſerved, about 1,000,000 inhabitants; who, according to a moderate eſtimate, are ſuppoſed to conſume the following proviſions weekly:

156 Number of inhabitants.

157 Weekly conſumpt of proviſions.

1000 Bullocks, at 6l. a-piece	L. 6000	0	0
6000 Sheep, at 12s. a-piece	3600	0	0
2000 Calves, at 1l. 4s. a-piece	2400	0	0
3000 Lambs, at 8s. a-piece, for ſix months	1200	0	0
1500 Hogs in pork and bacon, at 20s. for ſix months	1500	0	0
2000 Pigs, at 2s. 6d. a-piece	250	0	0
1000 Turkeys, at 3s. 6d. a-piece for ſix months	175	0	0
1000 Geeſe, at 2s. 6d. a-piece, for ſix months	125	0	0
2000 Capons, at 1s. 8d. a-piece	166	13	2
500 Dozens of chickens, at 9s. per dozen	225	0	0
4300 Ducks at 9d. a-piece	161	5	0
1500 Dozens of rabbits, at 7s. per dozen, for eight months	525	0	0
2000 Dozens of pigeons, at 2s. per dozen, for eight months	200	0	0
700 Dozens of wild fowl, of ſeveral ſorts, for ſix months	250	0	0
In ſalt and freſh fiſh, at 1d. a-day, for half a million of people for a week.	14,583	6	8
In bread of all ſorts, white and brown at 1d. a-day, for one million of people for a week	29,166	13	4
300 Tons of wine, of all ſorts, at 50l. a ton, one ſort with another, for one week	15,000	0	0
In milk, butter, cheeſe, &c. at 1d. a-day, for a million of people for a week	29,166	13	4
In fruit of all ſorts, at one farthing a-day, for a million of people for a week	7291	13	4
In eggs of hens, ducks, geeſe, &c. at half a farthing a-day, for a million of people for a week	3645	16	4
In beer and ale, ſtrong and ſmall, at 2d. a-day, for a million of people for a week	58.333	6	8
In ſugar, plums, and ſpice, and all ſorts of grocery, at a halfpenny a-day, for a million of people for a week	14,583	6	8
In wheat-flour, for pies and puddings, oat-meal and rice, &c. at half a farthing a-day, for a million of people for a week	3645	16	8
In ſalt, oil, vinegar, capers, olives, and other ſauces, at half a farthing a-day, for a million of people for a week	L. 3645	16	8
In roots and herbs of all ſorts, both for food and phyſic, at half a farthing a-day, for a million of people for a week	3645	16	8
In ſea-coal, charcoal, candles, and fire wood, of all ſorts, at 1d. a-day, for a million of people for a week	29,166	13	4
In paper of all ſorts (a great quantity being uſed in printing) quills, pens, ink, and wax, at a farthing a-day, for a million of people for a week	7291	13	4
In tobacco, pipes, and ſnuff, at half a farthing a-day, for a million of people for a week	3645	16	8
In clothing, as linen and woollen, for men, women, and children, ſhoes, ſtockings, &c. at 3s. 6d. per week, for a million of people for a week	175,000	0	0
Expences for horſe meat, in hay, oats, beans, 1000 load of hay a-week, at 40s. a load, comes to 2000l. in oats and beans the like value, 2000l. which is in all, for one week	4000	0	0
Cyder, mum, brandy, ſtrong waters, coffee, chocolate, tea, &c. at 1d. a-day, for a million of people for one week	29,166	13	4

158 Firing, porter, &c. The common firing is pit coal, commonly called *ſea coal*, of which there are conſumed upwards of 766,880 chaldrons every year. The annual conſumption of oil in London and Weſtminſter for lamps, amounts to 400,000l. In 1787, the quantity of porter brewed in London for home conſumption and foreign exportation, amounted to 1,176,856 barrels. In 1805 it amounted to 1,200,000 barrels of 36 gallons each.

The above was the weekly conſumption of the articles ſpecified a few years ago. The following is the annual conſumption of ſome of them eſtimated ſince the year 1800. Bullocks 110,000: ſheep and lambs 776,000: calves 210,000: hogs 210,000: ſucking pigs 60,000: milk in gallons 6,980,000; for which the inhabitants pay 481,666l. and this is the produce of 8,500 cows: vegetables and fruit 3,000,000l.: ſpirituous liquors and compounds 11,146,782 gallons: wine 32,500 tons: butter 16,600,000 pounds: cheeſe 21,100,000 pounds.

159 Supply of water. This great and populous city is happily ſupplied with abundance of freſh water from the Thames and the New River; which is not only of inconceivable ſervice to every family, but by means of fire plugs everywhere diſperſed, the keys of which are depoſited with the pariſh officers, the city is in a great meaſure ſecured from the ſpreading of fire; for theſe plugs are no ſooner opened, than there are vaſt quantities of water to ſupply the engines. This plenty of water has been attended with another advantage, it has given 160 Inſurance companies. riſe to ſeveral companies, who enſure houſes and goods from fire; an advantage that is not to be met with in any other nation on earth: the premium is ſmall; and the recovery in caſe of loſs is eaſy and certain.

tain. Every one of theſe offices keeps a ſet of men in pay, who are ready at all hours to give their aſſiſtance in caſe of fire; and who are on all occaſions extremely bold, dexterous, and diligent: but though all their labours ſhould prove unſucceſsful, the perſon who ſuffers by this devouring element has the comfort that muſt ariſe from a certainty of being paid the value (upon oath) of what he has enſured.

161 Places of diverſion, &c.

The places for diverſion are, Vauxhall, Ranelagh-gardens, the two play-houſes, the Pantheon, and the little theatre in the Hay Market, with Sadlers-wells, Hughes's Circus, and Aſtley's Royal-Grove, &c. The fineſt repoſitories of rarities and natural hiſtory, are Sir Hans Sloane's, in the Britiſh Muſeum, already deſcribed; and another collected by Sir Aſhton Lever, afterwards the private property of Mr Parkinſon, and depoſited in apartments for public inſpection, near the ſouth-end of Blackfriars bridge, was ſold in 1806.

The Royal Inſtitution owed its origin to a number of noblemen and gentlemen, who held meetings for the avowed purpoſe of ameliorating the condition of the poor. They firſt projected the plan of its foundation, which was matured by the exertions and talents of the indefatigable Count Rumford. The meetings began in 1800, ſhortly before which his majeſty granted the proprietors a charter of incorporation by the name of the *Royal Inſtitution of Great Britain*, for the purpoſe of facilitating the general introduction of uſeful mechanical inventions and improvements, and for teaching, by courſes of philoſophical lectures and experiments, the application of ſcience to the common purpoſes of life.

The government of the ſociety conſiſts of the preſident, 15 managers, and the ſecretary, choſen by and from among the proprietors. Of the 15 managers, one-third is elected annually, on the firſt of May. The houſe is ſituated in Albemarle-ſtreet, is extremely ſpacious, and well adapted to the purpoſes to which it is applied.

The London Inſtitution was formed in the autumn of 1805, by the indefatigable exertions of a few ſpirited individuals. The houſe in the mean time is in the Old Jewry, till the managers can procure a more ſuitable place. The deſign of it is to promote the diſſemination of ſcience, literature, and the arts: its view at preſent being confined to three objects, viz. the acquiſition of a a valuable and extenſive library; the diffuſion of uſeful knowledge by the means of lectures and experiments; and the eſtabliſhment of a reading room, where the foreign and domeſtic journals are provided for the uſe of the proprietors and ſubſcribers. The government of the inſtitution is veſted in a preſident, four vice-preſidents, twenty managers, and the ſecretary. The number of proprietors is limited to 1000, each of whom paid 75 guineas for a ſhare, and the life ſubſcribers pay 25 guineas.

LONDONDERRY, or COLERAIN, a county of Ireland, in the province of Ulſter. It is bounded on the ſouth and ſouth-weſt by the county of Tyronne; by Antrim on the eaſt, from which it is parted by the river Bann: by Donegal on the weſt; and that county and the Deucaledonian ocean on the north. Its greateſt length is about 36 miles, its breadth 30, containing about 251,510 acres. The bogs and heaths of this county are manured with ſea-ſhells, as thoſe of Donegal. Like that, too, it is pretty champaign, and not unfruitful. It is particularly noted for a very clear river called the *Bann*, abounding with ſalmon, a fiſh ſaid to delight in limpid ſtreams. This river, to diſtinguiſh it from a leſſer of the ſame name, is called the *Greater* or *Lower Bann*. In order to cultivate, ſettle, and civilize this county, King James I. granted it, by letters patent, to a ſociety, by the name of the *Governor and Aſſiſtants at London of the new plantation of Ulſter in the realm of Ireland*. It contains ſix baronies; and, beſides the two knights of the ſhire, ſends to parliament two members for the city of Londonderry, and two each for Colerain and Newton-Limavady or Lamnevady.

LONDONDERRY, or *Derry*, the capital of the county, and the ſee of a biſhop, ſtands at the bottom of Lough-Foyle. This city has a very good port, to which ſhips of the greateſt burden have acceſs, and a conſiderable trade. It will be ever famous for the gallantry and perſeverance with which it defended itſelf in three memorable ſieges, in defiance of the greateſt hardſhips and diſcouragements, namely, 1ſt, In 1641, when the rebels could not reduce it either by fraud or force. 2dly, In 1649, when it was beſieged by the lord Ardes, and reduced almoſt to extremity by famine, till at laſt relieved by troops ſent from England. 3dly, When it held out againſt the French and Iriſh from the 7th of December 1688 to the laſt day of July 1689, though it was neither well fortified nor provided with a garriſon or ſtores of proviſion and ammunition, and hardly any attempt made to relieve it during ſo long a time. Though the city is 20 miles up the river, yet very large ſhips can come up to the quay, where there are four or five fathoms of water. It is now well fortified with a ſtrong wall, beſides outworks; and along the banks of the river are ſeveral caſtles and a fort. This city is of no great antiquity, having been built and planted in the reign of James I. by a colony ſent by the ſociety above mentioned. The trade of the town is very conſiderable, having not only a large ſhare in the herring fiſhery, but ſending ſhips alſo to the Weſt Indies, New England, and Newfoundland, for which they are ſo advantageouſly ſituated, that a veſſel bound from thence to America often arrives there before a London ſhip can get clear of the ſoundings, or arrive in the latitude of Londonderry. Though there are a great many ſhallows in Lough-Foyle, which ſerves it inſtead of a road; yet they are eaſily avoided, as there are deep channels between them. Theſe points called *Emiſtone*, *Ruſterhull* or *Caldy head*, which lie a little to the weſt of the mouth of the harbour, are counted the moſt northerly of Ireland. The inhabitants of this city are almoſt all Proteſtants. It gave title of *earl* and *baron* to a branch of the family of Pitt, which became extinct in 1764; but part of the title was revived in Robert Stewart, who was created Baron Londonderry in 1789. A late traveller ſays, "Derry is, perhaps, the cleaneſt, beſt built, and moſt beautifully ſituated town in Ireland; and excepting Corke, as convenient as any for commerce, foreign and domeſtic." The lake almoſt ſurrounds it; and the whole ground-plot both of it and its liberties belongs to the 12 great companies of London. Great quantities of ſalmon, ſalted and barrelled, are exported from hence to America. It contains 10,000 inhabitants, and has a wooden bridge 1068 feet long, which was erected in 1791. Long. 7° 5′ W. Lat. 55° 4′ N.

LONG, an epithet given to whatever exceeds the uſual ſtandard of length.

Long-Boat, the largeſt and ſtrongeſt boat belonging to any ſhip. It is principally employed to carry great burdens, as anchors, cables, ballaſt, &c. See Boat.

LONG, Roger, D. D. maſter of Pembroke-hall in Cambridge, Lowndes's profeſſor of aſtronomy in that univerſity, rector of Cherryhinton in Huntingdonſhire, and of Bradwell *juxta mare* in Eſſex, was author of a well known and much approved treatiſe of aſtronomy, and the inventor of a remarkably curious aſtronomical machine, thus deſcribed by himſelf. "I have, in a room lately built in Pembroke-hall, erected a ſphere of 18 feet diameter, wherein above 30 perſons may ſit conveniently; the entrance into it is over the ſouth pole by ſix ſteps; the frame of the ſphere conſiſts of a number of iron meridians, not complete ſemicircles, the northern ends of which are ſcrewed to a large round plate of braſs, with a hole in the centre of it; through this hole, from a beam in the ceiling, comes the north pole, a round iron rod, about three inches long, and ſupports the upper parts of the ſphere to its proper elevation for the latitude of Cambridge; the lower part of the ſphere, ſo much of it as is inviſible in England, is cut off; and the lower or ſouthern ends of the meridians, or truncated ſemicircles, terminate on, and are ſcrewed down to, a ſtrong circle of oak, of about 13 feet diameter; which, when the ſphere is put into motion, runs upon large rollers of lignum vitæ, in the manner that the tops of ſome windmills are made to turn round. Upon the iron meridians is fixed a zodiac of tin painted blue, whereon the ecliptic and heliocentric orbits of the planets are drawn, and the conſtellations and ſtars traced: the Great and Little Bear and Draco are already painted in their places round the north pole; the reſt of the conſtellations are propoſed to follow: the whole is turned round with a ſmall winch, with as little labour as it takes to wind up a jack, though the weight of the iron, tin, and wooden circle, is about 1000 pounds. When it is made uſe of, a planetarium will be placed in the middle thereof. The whole, with the floor, is well ſupported by a frame of large timber." Thus far Dr Long, before this curious piece of mechaniſm was perfected. Since the above was written, the ſphere has been completely finiſhed; all the conſtellations and ſtars of the northern hemiſphere, viſible at Cambridge, are painted in their proper places upon plates of iron joined together, which form one concave ſurface. Dr Long publiſhed a Commencement Sermon 1728; and an anſwer to Dr Galley's pamphlet on Greek Accents; and died December 16th 1770, at the age of 91. As the materials for this article are ſcanty, we ſhall ſubjoin, from the Gentleman's Magazine *, a few traits of him, as delineated in 1769 by Mr Jones. "He is now in the 88th year of his age, and for his years vegete and active. He was lately (in October) put in nomination for the office of vice-chancellor. He executed that truſt once before, I think in the year 1737; a very ingenious perſon, and ſometimes very facetious. At the public commencement in the year 1713, Dr Greene (maſter of Bennet college, and afterwards biſhop of Ely) being then vice-chancellor, Mr Long was pitched upon for the tripos-performance; it was witty and humorous, and has paſſed through divers editions. Some that remembered the delivery of it, told me, that in addreſſing the vice-chancellor (whom the univerſity wags uſually ſtyled *Miſs Greene*), the tripos-orator, being a native of Norfolk, and aſſuming the Norfolk dialect, inſtead of ſaying, *Domine Vice-Cancellarie*, did very archly pronounce the words thus, *Domina Vice-Cancellaria*; which occaſioned a general ſmile in that great auditory. His friend the late Mr Bonfoy of Ripton told me this little incident, 'That he and Dr Long walking together in Cambridge in a duſky evening, and coming to a ſhort *poſt* fixed in the pavement, which Mr B. in the midſt of chat and inattention, took to be a *boy* ſtanding in his way, he ſaid in a hurry, 'Get out of my way, boy.' '*That boy, Sir*,' ſaid the doctor very calmly and ſlily, *is a* poſtboy, *who turns out of his way for nobody*.'—I could recollect ſeveral other ingenious repartees if there were occaſion. One thing is remarkable, he never was a hale and hearty man, always of a tender and delicate conſtitution, yet took great care of it. His common drink water. He always dines with the fellows in the hall. Of late years he has left off eating fleſh-meats; in the room thereof, puddings, vegetables, &c. ſometimes a glaſs or two of wine."

LONGEVITY, length of life.

From the different longevities of men in the beginning of the world, after the flood, and in theſe ages, Mr Derham draws an argument for the interpoſition of a divine Providence.

Immediately after the creation, when the world was to be peopled by one man and one woman, the ordinary age was 900 and upwards.—Immediately after the flood, when there were three perſons to ſtock the world, their age was cut ſhorter, and none of thoſe patriarchs, but Shem, arrived at 500. In the ſecond century we find none that reached 240: in the third, none but Terah that came to 200 years; the world, at leaſt a part of it, by that time being ſo well peopled, that they had built cities, and were cantoned out into diſtant nations. —By degrees, as the number of people increaſed, their *longevity* dwindled, till it came down at length to 70 or 80 years: and there it ſtood, and has continued to ſtand ever ſince the time of Moſes.—This is found a good medium, and by means hereof the world is neither overſtocked, nor kept too thin; but life and death keep a pretty equal pace.

That the common duration of man's life has been the ſame in all ages ſince the above period, is plain both from ſacred and profane hiſtory. To paſs by others, Plato lived to 81, and was accounted an old man: and the inſtances of *longevity* produced by Pliny, lib. vii. c. 48. as very extraordinary, may moſt of them be matched in modern hiſtories.—In the following Tables are collected into one point of view the moſt memorable inſtances of long-lived perſons of whoſe age we have any authentic records. The firſt and ſecond are extracted from *Mr Whitehurſt's Inquiry into the Origin and Strata of the Earth*, with ſome additions by Dr Fothergill; who inſerted them, accompanied by a third, together with a number of uſeful obſervations, in the firſt volume of the Memoirs of the Mancheſter Literary Society.

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* For 1783, p. 983.

Names of the Perſons.	Age.	Places of Abode.	Living or Dead.
Thomas Parre	152	Shropſhire	Died November 16. 1635. Phil. Tranſ. N° 44.
Henry Jenkins	169	Yorkſhire	Died December 8. 1670. Phil. Tranſ. N° 221.
Robert Montgomery	126	Ditto	Died in — — 1670.
James Sands	140	Staffordſhire	Do. Fuller's Worthies, p. 47.
His Wife	120	Ditto	
Counteſs of Deſmond	140	Ireland	Raleigh's Hiſt. p. 166.
————Ecleſton	143	Ditto	Died — — 1691. (A)
J. Sagar	112	Lancaſhire	—— — — 1668. (B)
—Laurence	140	Scotland	Living — — (C)
Simon Sack	141	Trionia	Died May 30. 1764.
Col. Thomas Winſlow	146	Ireland	—— Aug. 26. 1766.
Francis Conſiſt	150	Yorkſhire	—— Jan. — 1768.
Chriſt. J. Drakenberg	146	Norway	—— June 24. 1770. (D)
Margaret Forſter	136	Cumberland	Both living 1771.
————her daughter	104	Ditto	
Francis Bons	121	France	Died Feb. 6. 1769.
John Brookey	134	Devonſhire	Living — — 1777. (E)
James Bowels	152	Killingworth	Died Aug. 15. 1656. (F)
John Tice	125	Worceſterſhire	—— March 1774. (G)
John Mount	136	Scotland	—— Feb. 27. 1766. (H)
A. Goldſmith	140	France	—— June — 1776. (I)
Mary Yates	128	Shropſhire	—— — — 1776. (K)
John Bales	126	Northampton	—— April 5. 1776. (L)
William Ellis	130	Liverpool	—— Aug. 16. 1780. (M)
Louiſa Truxo, a Negreſs	175	Tucomea, S. America	Living Oct. 5. 1780 (N)
Margaret Patten	138	Lockneugh near Paiſley	Lynche's Guide to Health.
Janet Taylor	108	Fintray, Scotland	Died Oct. 10. 1780.
Richard Lloyd	133	Montgomery	Lynche's Guide to Health.
Suſannah Hilliar	100	Piddington, Northampſh	Died. Feb. 19. 1781. (O)
Ann Cockbolt	105	Stoke-Bruerne, *Ib.*	—— April 5. 1775. (P)
James Hayley	112	Middlewich, Cheſhire	—— March 17. 1781. (Q)

William Walker, aged 112, not mentioned above, who was a ſoldier at the battle of Edgehill.

If we look back to an early period of the Chriſtian era, we ſhall find that Italy has been, at leaſt about that time, peculiarly propitious to longevity. Lord Bacon obſerves that the year of our Lord 76, in the reign of Veſpaſian, was memorable; for in that year was a taxing which afforded the moſt authentic method of knowing the ages of men. From it, there were found in that part of Italy lying between the Apennine mountains and the river Po, 124 perſons who either equalled or exceeded 100 years of age, namely—

54 perſons of 100 years each.
57 - 110
2 - 125
4 perſons of 130 years.
4 - 136
3 - 140
In Parma 3 - 120
2 - 130
In Bruſſels 1 - 125
In Placentia 1 - 131
In Faventia 1 - 132
6 - 110
4 - 120
In Rimino 1 - 150 years, viz.
Marcus Aponius,
Mr

(A) Fuller's Worthies, p. 140.

(B) Phil. Tranſ. abridged by Lowthorp, vol iii. p. 30, 6.

(C) Derham's Phyſico-Theology, p. 173.

(D) Annual Regiſter.

(E) Daily Advertiſer, Nov. 18. 1777.

(F) Warwickſhire.

(G) Daily Advertiſer, March 1774.

(H) Morning Poſt, Feb. 29. 1776.

(I) Daily Advertiſer, June 24. 1776.

(K) Daily Advertiſer, Aug. 22. 1776.

(L) See Inſcription in the portico of All-Saints church.

(M) London Even. Poſt, Aug. 22. 1780.

(N) London Chronicle, Oct. 5. 1780.

(O) Northamp. Mercury, Feb. 19. 1781.

(P) Well known to perſons of credit in Northampton.

(Q) Gen. Evening Poſt, March 24. 1781.

Longevity.

Mr Carew, in his Survey of Cornwall, aſſures us, that it is no unuſual thing with the inhabitants of that county to reach 90 years of age and upwards, and even to retain their ſtrength of body and perfect uſe of their ſenſes. Beſides Brown, the Corniſh beggar, who lived to 120, and one Polezew to 130 years of age, he remembered the deceaſe of four perſons in his own pariſh, the ſum of whoſe years, taken collectively, amounted to 340. Now, although longevity evidently prevails more in certain diſtricts than in others, yet it is by no means confined to any particular nation or climate; nor are there wanting inſtances of it in almoſt every quarter of the globe, as appears from the preceding as well as the ſubſequent Table; which might have been conſiderably enlarged, had it appeared neceſſary; but we have only added, in the laſt, three recent inſtances that are peculiarly remarkable.

Names of the Perſons.	Age.	Places of Abode.	Where recorded.
Hippocrates, Phyſician	104	Iſland of Cos	Lynche on Health, chap. 3.
Democritus, Philoſopher	109	Abdera	Bacon's Hiſtory, 1095.
Galen, Phyſician	140	Pergamus	Voſſ. Inſt. lib. iii.
Albuna, Marc	150	Ethiopia	Hakewell's Ap. lib. i.
Dumitur Raduly	140	Haromſzeck, Tranſylvania	Died Jan. 18. 1782. General Gazetteer, April 18.
Titus Fullonius	150	Bononia	Fulgoſus, lib. viii.
Abraham Paiba	142	Charleſtown, South-Car.	General Gazetteer.
L. Tertulla	137	Ariminum	Fulgoſus, lib. viii.
Lewis Cornaro	100	Venice	Bacon's Hiſt. of Life, p. 134.
Robert Blackeney, Eſq.	114	Armagh, Ireland	General Gazetteer.
Margaret Scott	125	Dalkeith, Scotland	Inſcription on her tomb there.
W. Gulſtone	140	Ireland	Fuller's Worthies.
J. Bright	105	Ludlow	Lynche on Health.
William Poſtell	120	France	Bacon's Hiſtory, p. 134.
Jane Reeves	103	Eſſex	St James's Chron. June 14. 1781.
W. Paulet, Marquis of Wincheſter	106	Hampſhire	Baker's Chron. p. 502.
John Wilſon	116	Suffolk	Gen. Gaz. Oct. 29. 1782.
Patrick Wian	115	Leſbury, Northumber^{d}.	Plemp. Fundam. Med. § 4. c. 8.
M. Laurence	140	Orcades	Buchanan's Hiſt. of Scotland.
Evan Williams	145	Caermarthen workhouſe, ſtill alive	General Gazetteer, Oct. 12th 1782.
John Jacobs (R)	121	Mount Jura	All the public prints, Jan. 1790.
Matthew Tait (S)	123	Auchinleck, Ayrſhire	Died Feb. 19. 1792. Edin. Even. Cour. Mar. 8. 1792.
Donald Macleod (T)	104	Iſle of Sky. Alive Jan. 1792.	All the public prints at the end of 1790; and *Memoirs*, &c.

(R) This man, in 1789, at the age of 120, quitted his native hills, and from the ſummit of Mount Jura undertook a journey to Verſailles, to behold and return thanks to the national aſſembly for the vote which had freed him and his poor countrymen from the feudal yoke. In the early part of his life, he was a ſervant in the family of the prince de Beaufremont. His memory continued good to the laſt day of his life; and the principal inconveniences which he felt from his great age were, that his ſight was weakened, and the natural heat of his body was ſo diminiſhed, that he ſhivered with cold in the middle of the dog-days if he was not ſitting by a good fire. This old man was received in the body of the houſe by the national aſſembly, indulged with a chair, and directed to keep on his hat leſt he ſhould catch cold if he was to ſit uncovered. A collection was made for him by the members, which exceeded 500l. ſterling; but he lived not to return to Mount Jura. He was buried on Saturday the 31ſt of January 1790, with great funeral pomp, in the pariſh-church of St Euſtace at Paris.

(S) He ſerved as a private at the taking of Gibraltar in 1704.

(T) *Memoirs of the Life and gallant Exploits of the Old Highlander Serjeant Donald Macleod*, &c. publiſhed 1791, in the 103d year of his age.—This old gentleman, for it appears that he really is a gentleman both by birth and by behaviour, was born in the year of the Revolution, in the pariſh of Bracadill, in the iſle of Sky and county of Inverneſs, North Britain. He is a cadet of the family of Uiniſh in Sky; and deſcended, through his mother, from Macdonald of Slate, the anceſtor of the preſent Lord Macdonald. The earlier part of his life coincided with the famine of ſeven years in Scotland; which was ſo great as to ſuggeſt, even to the patriotic Mr Fletcher, the idea of the people ſelling themſelves as ſlaves for immediate ſubſiſtence. He

A certain author mentions a liſt collected by himſelf of 107 perſons, who all died at the age of 120 and upwards. Two of them attained the age of 150, three of 152, one of 154, one of 169, and another 175. In 1763 there were found in Sweden 988 females above 90 years of age. We have ſeen a liſt of 104 perſons, none of whom died under 120 years of age, and one of them, it is ſaid, lived to the prodigious age of 180. Forty-one of them belonged to England, 16 to Scotland, and 24 to Ireland.

The antediluvians are purpoſely omitted, as bearing too little reference to the preſent race of mortals, to afford any ſatisfactory concluſions; and as they have been already taken notice of in a ſeparate article; (ſee ANTEDILUVIANS). As the improbable ſtories of ſome perſons who have almoſt rivalled them in modern times, border too much upon the marvellous to find a place in theſe tables, the preſent examples are abundantly ſufficient to prove, that longevity does not depend, ſo much as has been ſuppoſed, on any particular climate, ſituation, or occupation in life: for we ſee, that it often prevails in places where all theſe are extremely diſſimilar; and it would, moreover, be very difficult, in the hiſtories of the ſeveral perſons above mentioned, to find any circumſtance common to them all, except, perhaps, that of being born of healthy parents, and of being inured to daily labour, temperance, and ſimplicity of diet. Among the inferior ranks of mankind, therefore, rather than among the ſons of eaſe and luxury, ſhall we find the moſt numerous inſtances of longevity; even frequently, when other external circumſtances ſeem extremely unfavourable; as in the caſe of the poor ſexton at Peterborough, who, notwithſtanding his unpromiſing occupation among dead bodies, lived long enough to bury two crowned heads, and to ſurvive two complete generations. The livelihood of Henry Jenkins and old Parre is ſaid to have conſiſted chiefly of the coarſeſt fare, as they depended on precarious alms. To which may be added the remarkable inſtance of Agnes Milbourne, who, after bringing forth a numerous offſpring, and being obliged, through extreme indigence, to paſs the latter part of her life in St Luke's workhouſe, yet reached her 106th year in that ſordid and unfriendly ſituation. The plain diet and invigorating employments of a country life are acknowledged on all hands to be highly conducive to health and longevity, while the luxury and refinements of large cities are allowed to be equally deſtructive to the human ſpecies; and this conſideration alone, perhaps, more than counterbalances all the boaſted privileges of ſuperior elegance and civilization reſulting from a city life.

From country villages, and not from crowded cities, have the preceding inſtances of longevity been chiefly ſupplied. Accordingly it appears, from the London bills of mortality, during a period of 30 years, viz. from the year 1728 to 1758, the ſum of the deaths amounted to 750,322, and that, in all this prodigious number, only 242 perſons ſurvived the 100th year of their age! This overgrown metropolis is computed by Dr Price to contain a ninth part of the inhabitants of England, and to conſume annually 7000 perſons, who remove into it from the country every year, without increaſing it. He moreover obſerves, that the number of inhabitants in England and Wales has diminiſhed about one-fourth part ſince the Revolution; and ſo rapidly of late, that in 11 years, near 200,000 of our common people have been loſt. If the calculation be juſt, however alarming it may appear in a national view, there is this conſolation, when conſidered in a philoſophical light, that without partial evil, there can be no general good;

and

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was bred in the midſt of want and hardſhips, cold, hunger, and for the years of his apprenticeſhip with a maſon and ſtone-cutter in Invernefs, in inceſſant fatigue. He inliſted, when a boy, in the Scottiſh ſervice, in the town of Perth in the laſt year of the reign of King William. The regiment into which he inliſted was the Scots Royals, commanded by the earl of Orkney. That old military corps, at that time, uſed bows and arrows as well as ſwords, and wore ſteel caps. He ſerved in Germany and Flanders under the duke of Marlborough; under the duke of Argyle, in the rebellion 1715; in the Highland Watch, or companies raiſed for enforcing the laws in the Highlands; in the ſame companies when, under the name of the 42d regiment, they were ſent abroad to Flanders, to join the army under the duke of Cumberland; in the ſame regiment in Ireland, and on the breaking out of the French war, 1757, in America. From the 42d he was draughted to act as a drill ſerjeant in the 78th regiment, in which he ſerved at the reduction of Louiſburg and Quebec: After this he became an out-penſioner of Chelſea Hoſpital. But ſuch was the ſpirit of this brave and hardy veteran, that he ſerved in 1761 as a volunteer in Germany under the marquis of Granby; and offered his ſervices in the American war to Sir Henry Clinton; who, though he declined to employ the old man in the fatigues and dangers of war, treated him with great kindneſs, allowed him a liberal weekly penſion out of his own pocket, and ſent him home in a ſhip charged with deſpatches to government.—The ſerjeant, "as his memory, according to the obſervation of his biographer, is impaired, does not pretend to make an exact enumeration of all his offspring: but he knows of 16 ſons now living, 14 of whom are in the army and navy, beſides daughters; the eldeſt of whom by his preſent wife is a mantuamaker at Newcaſtle.—His eldeſt ſon is now 83 years old, and the youngeſt only nine. Nor, in all probability, would this lad cloſe the rear of his immediate progeny, if his preſent wife, the boy's mother, had not attained to the 49th year of her age."—In his prime, he did not exceed five feet and ſeven inches. He is now inclined through age to five feet five inches. He has an intereſting phyſiognomy, expreſſive of ſincerity, ſenſibility, and manly courage. His biographer very properly ſubmits it to the conſideration of the Polygraphic Society, whether they might not do a thing worthy of themſelves and their ingenious art, if they ſhould multiply likeneſſes of this living antiquity, and circulate them at an eaſy rate throughout Britain and Europe. They would thus gratify a very general curioſity; a curioſity not confined to the preſent age.

and that what a nation loſes in the ſcale of population at one period, it gains at another; and thus probably, the average number of inhabitants on the ſurface of the globe continues at all times nearly the ſame. By this medium, the world is neither overſtocked with inhabitants nor kept too thin, but life and death keep a tolerably equal pace. The inhabitants of this iſland, comparatively ſpeaking, are but as the duſt of the balance; yet inſtead, of being diminiſhed, we are aſſured by other writers, that within theſe 30 years they are greatly increaſed.

The deſire of ſelf-preſervation, and of protracting the ſhort ſpan of life, is ſo intimately interwoven with our conſtitution, that it is juſtly eſteemed one of the firſt principles of our nature, and, in ſpite even of pain and miſery, ſeldom quits us to the laſt moments of our exiſtence. It ſeems, therefore, to be no leſs our duty than our intereſt, to examine minutely into the various means that have been conſidered as conducive to health and long life: and, if poſſible, to diſtinguiſh ſuch circumſtances as are eſſential to that great end from thoſe which are merely accidental. But here it is much to be regretted, that an accurate hiſtory of the lives of all the remarkable perſons in the above table, ſo far as relates to the diet, regimen, and the uſe of the non-naturals, has not been faithfully handed down to us; without which it is impoſſible to draw the neceſſary inferences. Is it not then a matter of aſtoniſhment, that hiſtorians and philoſophers have hitherto paid ſo little attention to longevity? If the preſent imperfect liſt ſhould excite others, of more leiſure and better abilities, to undertake a full inveſtigation of ſo intereſting a ſubject, the inquiry might prove not only curious but highly uſeful to mankind. In order to furniſh materials for a future hiſtory of longevity, the bills of mortality throughout the kingdom ought firſt to be reviſed, and put on a better footing, agreeable to the ſcheme of which Mancheſter and Cheſter have already given a ſpecimen highly worthy of imitation. The plan, however, might be further improved with very little trouble, by adding a particular account of the diet and regimen of every perſon who dies at 80 years of age or upwards; and mentioning whether his parents were healthy, long-lived people, &c. An accurate regiſter, thus eſtabliſhed throughout the Britiſh dominions, whould be productive of many important advantages to ſociety, not only in a medical and philoſophical, but alſo in a political and moral view.

All the circumſtances that are moſt eſſentially neceſſary to life, may be compriſed under the ſix following heads: 1. Air and climate; 2. Meat and drink; 3. Motion and reſt; 4. The ſecretions and excretions; 5. Sleep and watching; 6. Affections of the mind.

Theſe, though all perfectly natural to the conſtitution, have by writers been ſtyled the non-naturals, by a ſtrange perverſion of language; and have been all copiouſly handled under that improper term. However, it may not be amiſs to offer a few ſhort obſervations on each, as they are ſo immediately connected with the preſent ſubject.

1. *Air*, &c. It has long been known that freſh air is more immediately neceſſary to life than food; for a man may live two or three days without the latter, but not many minutes without the former. The vivifying principle contained in the atmoſphere, ſo eſſential to the ſupport of flame, as well as animal life, concerning which authors have propoſed ſo many conjectures, appears now to be nothing elſe but that pure dephlogiſticated fluid lately diſcovered by that ingenious philoſopher Dr Prieſtley. The common atmoſphere may well be ſuppoſed to be more or leſs healthy in proportion as it abounds with this animating principle. As this exhales in copious ſteams from the green leaves of all kinds of vegetables, even from thoſe of the moſt poiſonous kinds, may we not, in ſome meaſure account why inſtances of longevity are ſo much more frequent in the country than in large cities; where the air, inſtead of partaking ſo largely of this ſalutary impregnation, is daily contaminated with noxious animal effluvia and phlogiſton?

With reſpect to climate, various obſervations conſpire to prove, that thoſe regions which lie within the temperate zones are beſt calculated to promote long life. Hence, perhaps, may be explained, why Italy has produced ſo many long livers, and why iſlands in general are more ſalutary than continents; of which Bermudas and ſome others afford examples. And it is a pleaſing circumſtance that our own iſland appears from the above table (notwithſtanding the ſudden viciſſitudes to which it is liable) to contain far more inſtances of longevity than could well be imagined. The ingenious Mr Whitehurſt aſſures us, from certain facts, that Engliſhmen are in general longer lived than North Americans; and that a Britiſh conſtitution will laſt longer, even in that climate, than a native one. But it muſt be allowed in general, that the human conſtitution is adapted to the peculiar ſtate and temperature of each reſpective climate, ſo that no part of the habitable globe can be pronounced too hot or too cold for its inhabitants. Yet, in order to promote a friendly intercourſe between the moſt remote regions, the Author of nature has wiſely enabled the inhabitants to endure great and ſurpriſing chnges of temperature with impunity.

2. *Foods and drink.* Though foods and drink of the moſt ſimple kinds are allowed to be the beſt calculated for ſupporting the body in health, yet it can hardly be doubted but variety may be ſafely indulged occaſionally, provided men would reſtrain their appetites within the bounds of temperance: for bountiful Nature cannot be ſuppoſed to have poured forth ſuch a rich profuſion of proviſions, merely to tantalize the human ſpecies, without attributing to her the part of a cruel ſtepdame, inſtead of that of the kind and indulgent parent. Beſides, we find, that by the wonderful powers of the digeſtive organs, a variety of animal and vegetable ſubſtances, of very diſcordant principles, are happily aſſimilated into one bland homogeneous chyle; therefore it ſeems natural to diſtruſt thoſe cynical writers, who would rigidly confine mankind to one ſimple diſh, and their drink to the mere water of the brook. Nature, it is true, has pointed out that mild inſipid fluid as the univerſal diluent, and therefore moſt admirably adapted for our daily beverage. But experience has equally proved, that vinous and ſpirituous liquors, on certain occaſions, are no leſs ſalutary and beneficial, whether it be to ſupport ſtrength againſt ſickneſs or bodily fatigue, or to exhilerate the mind under the preſſure of heavy misfortunes. But, alas!

what Nature meant for innocent and uſeful cordials, to be uſed only occaſionally, and according to the direction of reaſon, cuſtom and caprice have by degrees rendered habitual to the human frame, and liable to the moſt enormous and deſtructive abuſes. Hence it may be juſtly doubted, whether gluttony and intemperance have not depopulated the world more than even the ſword, peſtilence, and famine. True, therefore, is the old maxim, "*Modus utendi ex veneno facit medicamentum, ex medicamento venenum.*

3. and 4. *Motion and reſt, ſleep and watching.* It is allowed on all hands, that alternate motion and reſt, and ſleep and watching, are neceſſary conditions to health and longevity; and that they ought to be adapted to age, temperament, conſtitution, temperature of the climate, &c.; but the errors which mankind daily commit in theſe reſpects become a fruitful ſource of diſeaſes. While ſome are bloated and relaxed with eaſe and indolence, others are emaciated, and become rigid through hard labour, watching, and fatigue.

5. *Secretions and excretions.* Where the animal functions are duly performed, the ſecretions go on regularly; and the different evacuations ſo exactly correſpond to the quantity of aliment taken in, in a given time, that the body is found to return daily to nearly the ſame weight. If any particular evacuation happen to be preternaturally diminiſhed, ſome other evacuation is proportionally augmented, and the equilibrium is commonly preſerved; but continued irregularities, in theſe important functions, cannot but terminate in diſeaſe.

6. *Affections of the mind.* The due regulation of the paſſions, perhaps, contributes more to health and longevity than that of any other of the non-naturals. The animating paſſions, ſuch as joy, hope, love, &c. when kept within proper bounds, gently excite the nervous influence, promote an equable circulation, and are highly conducive to health; while the depreſſing affections, ſuch as fear, grief, and deſpair, produce the contrary effect, and lay the foundation of the moſt formidable diſeaſes.

From the light which hiſtory affords us, as well as from ſome inſtances in the above table, there is great reaſon to believe, that longevity is in a great meaſure hereditary; and that healthy long-lived parents would commonly tranſmit the ſame to their children, were it not for the frequent errors in the non-naturals, which ſo evidently tend to the abbreviation of human life.

Where is it, but from theſe cauſes, and the unnatural modes of living, that, of all the children which are born in the capital cities of Europe, nearly one half die in early infancy? To what elſe can we attribute this extraordinary mortality? Such an amazing proportion of premature deaths is a circumſtance unheard of among ſavage nations, or among the young of other animals! In the earlieſt ages, we are informed, that human life was protracted to a very extraordinary length; yet how few perſons, in theſe latter times, arrive at that period which nature ſeems to have deſigned! Man is by nature a field animal, and ſeems deſtined to riſe with the ſun, and to ſpend a large portion of his time in the open air, to inure his body to robuſt exerciſes and the inclemency of the ſeaſons, and to make a plain homely repaſt only when hunger dictates. But art has ſtudiouſly defeated the kind intentions of nature; and by enſlaving him to all the blandiſhments of ſenſe, has left him, alas! an eaſy victim to folly and caprice. To enumerate the various abuſes which take place from the earlieſt infancy, and which are continued through the ſucceeding ſtages of modiſh life, would carry us far beyond our preſent intention. Suffice it to obſerve, that they prevail more particularly among people who are the moſt highly poliſhed and refined. To compare their artificial mode of life with that of nature, or even with the long-livers in the liſt, would probably afford a very ſtriking contraſt; and at the ſame time ſupply an additional reaſon why, in the very large cities, inſtances of longevity are ſo very rare.

LONGFORD, a county of Ireland, in the province of Leinſter, bounded by the counties of Leitrim and Cavan on the north, Meath on the eaſt and ſouth, and Roſcommon on the weſt. It contains 143,700 Iriſh plantation acres, 24 pariſhes, 6 baronies, and 4 boroughs; and returns 10 members to parliament. It is ſmall, and much encumbered with bog, intermixed with a tolerable good ſoil; and is about 25 miles long and 15 broad.

LONGFORD, a town of Ireland, ſituated on the river Cromlin, in the county of Longford and province of Leinſter, 64 miles from Dublin; which river falls a few miles below this place into the Shannon. It is a borough, poſt, market, and fair town; and returns two members to parliament; patron, Lord Longford. It gave title of *earl* to the family of Aungier; of *viſcount*, to the family of Micklethwaite; and now gives that of *baron* to the family of Packenham. Within a mile and a half of the town is a charter-ſchool for above 40 children. This place has a barrack for a troop of horſe. It is large and well built; and in a very early age an abbey was founded here, of which St Idus, one of St Patrick's diſciples, was abbot. In the year 1400, a fine monaſtery was founded to the honour of the Virgin Mary, for Dominican friars, by O'Ferral prince of Annaly. This monaſtery being deſtroyed by fire, Pope Martin V. by a bull in the year 1429, granted an indulgence to all who ſhould contribute to the rebuilding of it. In 1433, Pope Eugene IV. granted a bull to the ſame purpoſe; and in 1438 he granted another to the like effect. The church of this friary, now the pariſh church, is in the dioceſe of Ardagh. The fairs are four in the year.

LONG-ISLAND, is an iſland of North America, belonging to the ſtate of New-York, which is ſeparated from the continent by a narrow channel. It extends from the city of New-York eaſt 140 miles, terminating with Montauk point; and is not more than 10 miles in breadth on a medium. It is divided into three counties, King's, Queen's, and Suffolk. The ſouth ſide of the iſland is flat land, of a light ſandy ſoil, bordered on the ſea-coaſt with large tracts of ſalt meadow, extending from the weſt point of the iſland to Southampton. This ſoil, however, is well calculated for raiſing grain, eſpecially Indian corn. The north ſide of the iſland is hilly, and of a ſtrong ſoil, adapted to the culture of grain, hay, and fruit. A ridge of hills extends from Jamaica to South-hold. Large herds of cattle feed upon Hampſtead plain and on the ſalt marſhes upon the ſouth ſide of the iſland. Hampſtead plain in Queen's county is a curioſity. It is 16 miles in length, eaſt and weſt, and 7 or 8 miles wide. The ſoil is black and to appearance rich, and yet it was never known to have any natural growth, but a kind of wild graſs and a few ſhrubs. It is frequented by vaſt numbers of plover. Rye grows tolerably well on ſome parts of the plain. The moſt of it lies common for cattle, horſes, and ſheep. As there is nothing to impede the proſpect in the whole length of this plain, it has a curious but tireſome effect upon the eye, not unlike that of the ocean. The iſland contains 30,863 inhabitants.

LONGIMETRY, the art of meaſuring lengths, both acceſſible and inacceſſible. See GEOMETRY and TRIGONOMETRY.

LONGING, is a preternatural appetite in pregnant women, and in ſome ſick perſons when about to recover. It is called *pica*, from the bird of that name, which is ſaid to be ſubject to the ſame diſorder. The diſorder conſiſts of both a deſire of unuſual things to eat and drink, and in being ſoon tired of one and wanting another. It is called *malacia*, from μαλακος, "weakneſs." In pregnant women it is ſomewhat relieved by bleeding, and in about the fourth month of their pregnancy it leaves them. Chlorotic girls, and men who labour under ſuppreſſed hemorrhoids, are very ſubject to this complaint, and are relieved by promoting the reſpective evacuations. In general, whether this diſorder is obſerved in pregnant women, in perſons recovering from an acute fever, or thoſe who labour under obſtructions of the natural evacuations, this craving of the appetite ſhould be indulged.

LONGINICO, a town of Turkey in Europe, in the Morea, anciently called *Olympia*, famous for being the place where the Olympic games were celebrated, and for the temple of Jupiter Olympus, about a mile diſtant. It is now but a ſmall place, ſeated on the river Alpheus, 10 miles from its mouth, and 50 ſouth of Lepanto. E. Long. 22. 0. N. Lat. 37. 30.

LONGINUS, DIONYSIUS, a celebrated Greek critic of the third century, was probably an Athenian. His father's name is unknown, but by his mother he was allied to the celebrated Plutarch. His youth was ſpent in travelling with his parents, which gave him an opportunity to increaſe his knowledge, and improve his mind. After his travels, he fixed his reſidence at Athens, and with the greateſt aſſiduity applied to ſtudy. Here he publiſhed his Treatiſe on the Sublime; which raiſed his reputation to ſuch a height, and gave the Athenians ſuch an opinion of his judgement and taſte, that they made him ſovereign judge of all authors, and every thing was received and rejected by the public according to his deciſions. He ſeems to have ſtaid at Athens a long time; here he taught the academic philoſophy, and among others had the famous Porphyry for his pupil. But it was at length his fortune to be drawn from Athens, and to mix in more active ſcenes; to train up young princes to virtue and glory; to guide the buſy paſſions of the great to noble objects; to ſtruggle for, and at laſt to die in, the cauſe of liberty. Zenobia, queen of the Eaſt, prevailed on him to undertake the education of her ſons: and he ſoon gained an uncommon ſhare in her eſteem: ſhe ſpent the vacant hours of her life in his converſation, and modelled her ſentiments and conduct by his inſtructions. That princeſs was at war with Aurelian; and being defeated by him near Antioch, was compelled to ſhut herſelf up in Palmyra, her capital city. The emperor wrote her a letter, in which he ordered her to ſurrender; to which ſhe returned an anſwer, drawn up by Longinus, which filled him with reſentment. The emperor laid ſiege to the city; and the Palmyrians were at length obliged to open their gates and receive the conqueror. The queen and Longinus endeavoured to fly into Perſia; but were unhappily overtaken and made priſoners when they were on the point of croſſing the Euphrates. The queen, intimidated, weakly laid the blame of vindicating the liberty of her country on its true author; and the brave Longinus, to the diſgrace of the conqueror, was carried way to immediate execution. The writings of Longinus were numerous, ſome on philoſophical, but the greater part on critical ſubjects. Dr Pearce has collected the titles of 25 treatiſes, none of which, excepting that on the Sublime, have eſcaped the depredations of time and barbarians. On this imperfect piece the great fame of Longinus is raiſed, who, as Pope expreſſes it—"is himſelf the great ſublime he draws." The beſt edition of his works is that by Tollius, printed at Utrecht in 1694, *cum notis variorum*. It has been tranſlated into Engliſh by Mr Smith.

LONGISSIMUS DORSI. See ANATOMY, *Table of the Muſcles*.

LONGITUDE, in *Geography* and *Navigation*, is the diſtance of any place from another eaſtward or weſtward, counted in degrees upon the equator: but when the diſtance is reckoned by leagues or miles and not in degrees, or in degrees on the meridian, and not of the parallel of latitude, in which caſe it includes both latitude and longitude, it is called *departure*.

To find the longitude at ſea, is a problem to which the attention of navigators and mathematicians has been drawn ever ſince navigation began to be improved.—The importance of this problem ſoon became ſo well known, that, in 1598, Philip III. of Spain offered a reward of 1000 crowns for the ſolution; and his example was ſoon followed by the States General, who offered 10,000 florins. In 1714 an act was paſſed in the Britiſh parliament, empowering certain commiſſioners to make out a bill for a ſum not exceeding 2000l. for defraying the neceſſary expences of experiments for aſcertaining this point; and likewiſe granting a reward to the perſon who made any progreſs in the ſolution, proportionable to the degree of accuracy with which the ſolution was performed: 10,000l. was granted if the longitude ſhould be determined to one degree of a great circle, or 60 geographical miles; 15,000l. if to two thirds of that diſtance; and 20,000l. if to half the diſtance.

In conſequence of theſe proffered rewards, innumerable attempts were made to diſcover this important ſecret. The firſt was that of John Morin profeſſor of mathematics at Paris, who propoſed it to Cardinal Richelieu; and though it was judged inſufficient on account of the imperfection of the lunar tables, a penſion of 2000 livres per annum was procured for him in 1645 by Cardinal Mazarine. Gemma Friſius had indeed, in 1530, projected a method of finding the longitude by means of watches, which at that time were newly invented: but the ſtructure of theſe machines was then by far too imperfect to admit of any attempt; nor even in 1631, when Metius made an attempt to this purpoſe, were they advanced in any conſiderable degree. About the year 1664, Dr Hooke and Mr Huygens made a very great improvement in watchmaking, by the application of the pendulum ſpring. Dr Hooke having quarrelled with the miniſtry, no experiment was made with any of his machines; but many were made with thoſe of Mr Huygens. One experiment particularly, made by Major Holmes, in a voyage from the coaſt of Guinea in 1665, anſwered ſo well, that Mr Huygens was encouraged to improve the ſtructure of his watches: but it was found that the variations of heat and cold produced ſuch alterations in the rate of going of the watch, that unleſs this could be remedied, the watches could be of little uſe in determining the longitude.

In 1714 Henry Sully, an Engliſhman, printed a ſmall tract at Vienna upon the ſubject of watchmaking. Having afterwards removed to Paris, he applied himſelf to the improvement of time-keepers for the diſcovery of the longitude. He taught the famous Julian de Roy: and this gentleman, with his ſon, and M. Berthoud, are the only perſons who ſince the days of Sully, have turned their thoughts this way. But though experiments have been made at ſea with ſome of their watches, it does not appear that they have been able to accompliſh any thing of importance with regard to the main point. The firſt who ſucceeded in any conſiderable degree was Mr John Harriſon; who, in 1726, produced a watch which went ſo exactly, that for ten years together it did not err above one ſecond in a month. In 1736 it was tried in a voyage to Liſbon and back again, on board one of his majeſty's ſhips; during which it corrected an error of a degree and a half in the computation of the ſhip's reckoning. In conſequence of this he received public encouragement to go on: and by the year 1761 had finiſhed three time-keepers, each of them more accurate than the former. The laſt turned out ſo much to his ſatisfaction, that he now applied to the commiſſioners of longitude for leave to make an experiment with his watch in a voyage to the Weſt Indies. Permiſſion being granted, his ſon Mr William Harriſon ſet out in his majeſty's ſhip the Deptford for Jamaica in the month of November 1761. This trial was attended with all imaginable ſucceſs. The longitude of the iſland, as determined by the time-keeper, differed from that found by aſtronomical obſervations only one minute and a quarter of the equator; the longitudes of places ſeen by the way being alſo determined with great exactneſs. On the ſhip's return to England, it was found to have erred no more during the whole voyage than 1' 54½" in time, which is little more than 28 miles in diſtance; which being within the limits preſcribed by the act, the inventor claimed the whole 20,000l. offered by government. Objections to this, however, were ſoon ſtarted. Doubts were pretended about the real longitude of Jamaica, as well as the manner in which the time had been found both there and at Portſmouth. It was alleged alſo, that although the time-keeper happened to be right at Jamaica, and after its return to England, this was by no means a proof that it had always been ſo in the intermediate times; in conſequence of which allegations, another trial was appointed in a voyage to Barbadoes. Precautions were now taken to obviate as many of theſe objections as poſſible. The commiſſioners ſent out proper perſons to make aſtronomical obſervations at that iſland: which, when compared with others in England, would aſcertain beyond a doubt its true ſituation. In 1764 then, Mr Harriſon junior ſet ſail for Barbadoes; and the reſult of the experiment was, that the difference of longitude betwixt Portſmouth and Barbadoes was ſhown by the time-keeper to be 3h. 55' 3"; and by aſtronomical obſervations to be 3h. 54' 20"; the error being now only 43" of time, or 10' 45" of longitude. In conſequence of this and the former trials, Mr Harriſon received one half of the reward promiſed, upon making a diſcovery of the principles upon which his time-keepers were conſtructed. He was likewiſe promiſed the other half of the reward as ſoon as time-keepers ſhould be conſtructed by other artiſts which ſhould anſwer the purpoſe as well as thoſe of Mr Harriſon himſelf. At this time he delivered up all his time-keepers, the laſt of which was ſent to Greenwich to be tried by Mr Nevil Maſkelyne, the aſtronomer-royal. On trial, however, it was found to go with much leſs regularity than had been expected; but Mr Harriſon attributed this to his having made ſome experiments with it which he had not time to finiſh when he was ordered to deliver up the watch. Soon after this, an agreement was made by the commiſſioners with Mr Kendall to conſtruct a watch upon Mr Harriſon's principles; and this upon trial was found to anſwer the purpoſe even better than any that Harriſon himſelf had conſtructed. This watch was ſent out with Captain Cook in 1772; and during all the time of his voyage round the world in 1772, 1773, 1774, and 1775, never erred quite 14½ ſeconds per day: in conſequence of which, the houſe of commons, in 1774, ordered the other 10,000l. to be paid to Mr Harriſon. Still greater accuracy, however, has been attained. A watch was lately conſtructed by Mr Arnold, which, during a trial of 13 months, from February 1779 to February 1780, varied no more than 6.69" during any two days; and the greateſt difference between its rates of going on any day and the next to it was 4.11". The greateſt error it would have committed therefore in the longitude during any ſingle day would have been very little more than one minute of longitude; and thus might the longitude be determined with as great exactneſs as the latitude generally can.—This watch, however, has not yet been tried at ſea.

Thus the method of conſtructing time-keepers for diſcovering the longitude ſeems to be brought to as great a degree of perfection as can well be expected. Still, however, as theſe watches are ſubject to accidents, and may thus alter the rate of their going without any poſſibility of a diſcovery, it is neceſſary that ſome other method ſhould be fallen upon, in order to correct from time to time thoſe errors which may ariſe either from the natural going of the watch, or from any accident which may happen to it. Methods of this kind are all founded upon celeſtial obſervations of ſome kind or other; and for theſe methods, or even for an improvement in time-keepers, rewards are ſtill held out by government. After the diſcoveries made by Mr Harriſon, the act concerning the longitude was repealed, excepting ſo much of it as related to the conſtructing, printing, publiſhing, &c. of nautical almanacks and other uſeful tables. It was enacted alſo, that any perſon who ſhall diſcover a method for finding the longitude by means of a time-keeper, the principles of which have not hitherto been made public, ſhall be entitled to a reward of 5000l. if, after certain trials made by the commiſſioners, the ſaid method ſhall enable a ſhip to keep her longitude, during a voyage of ſix months, within 60 geographical miles, or a degree of a great circle. If the ſhip keeps her longitude within 40 geographical miles for that time, the inventor is entitled to a reward of 7500l. and to 10,000l. if the longitude is kept within half a degree. If the method is by improved aſtronomical tables, the author is entitled to 5000l. when they ſhow the diſtance of the moon from the ſun and ſtars within 15 ſeconds of a degree, anſwering to about 7 minutes of longitude, after allowing half a degree for errors of obſervation and under certain reſtrictions, and after compariſon with aſtronomical obſervations for a period of 18½ years, during which the lunar irregularities are ſuppoſed to be completed. The ſame rewards are offered to the perſon who ſhall with the like accuracy diſcover any other method of finding the longitude.

Theſe methods require celeſtial obſervations; and any of the phenomena, ſuch as the different apparent places of ſtars with regard to the moon, the beginning and ending of eclipſes, &c. will anſwer the purpoſe: only it is abſolutely neceſſary that ſome variation ſhould be perceptible in the phenomenon in the ſpace of two minutes; for even this ſhort ſpace of time will produce an error of 30 miles in longitude. The moſt proper phenomena therefore for determining the longitude in this manner are the eclipſes of Jupiter's ſatellites. Tables of their motions have been conſtructed, and carefully corrected from time to time, as the mutual attractions of theſe bodies are found greatly to diſturb the regularity of their motions. The difficulty here, however, is to obſerve theſe eclipſes at ſea; and this difficulty has been found ſo great, that no perſon ſeems able to ſurmount it. The difficulty ariſes from the violent agitation of a ſhip in the ocean, for which no adequate remedy has ever yet been found, nor probably will ever be found. Mr Chriſtopher Irwin indeed invented a machine which he called a *marine chair*, with a view to prevent the effects of this agitation; but on trying it in a voyage to Barbadoes, it was found to be totally uſeleſs.

A whimſical method of finding the longitude was propoſed by Meſſrs Whiſton and Ditton from the report and flaſh of great guns. The motion of ſound is known to be nearly equable, from whatever body it proceeds or whatever be the medium. Suppoſing therefore a mortar to be fired at any place the longitude of which is known, the difference between the moment that the flaſh is ſeen and the report heard will give the diſtances between the two places; whence, if we know the latitudes of theſe places, their longitudes muſt alſo be known. If the exact time of the exploſion be known at the place where it happens, the difference of time at the place where it is heard will likewiſe give the difference of longitude. Let us next ſuppoſe the mortar to be loaded with an iron ſhell filled with combuſtible matter, and fired perpendicularly upward into the air, the ſhell will be carried to the height of a mile, and will be ſeen at the diſtance of near 100; whence, ſuppoſing neither the flaſh of the mortar ſhould be ſeen nor the report heard, till the longitude might be determined by the altitude of the ſhell above the horizon.

According to this plan, mortars were to be fired at certain times and at proper ſtations along all frequented coaſts for the direction of mariners. This indeed might be of uſe, and in ſtormy weather might be a kind of improvement in lighthouſes, or a proper addition to them; but with regard to the determination of longitudes, is evidently ridiculous.

We ſhall now proceed to give ſome practical directions for finding the longitude at ſea by proper celeſtial obſervations; excluſive of thoſe from Jupiter's ſatellites, which, for reaſons juſt mentioned, cannot be practiſed at ſea. In the firſt place, however, it will be neceſſary to point out ſome of thoſe difficulties which ſtand in the way, and which render even this method of finding the longitude precarious and uncertain. Theſe lie principally in the reduction of the obſervations of the heavenly bodies made on the ſurface of the earth to ſimilar obſervations ſuppoſed to be made at the centre; which is the only place where the celeſtial bodies appear in their proper ſituation. It is alſo very difficult to make proper allowances for the refraction of the atmoſphere, by which all objects appear higher than they really are; and another difficulty ariſes from their parallaxes, which make them, particularly the moon, appear lower than they would otherwiſe do, excepting when they are in the very zenith. It is alſo well known, that the nearer the horizon any celeſtial body is, the greater its parallax will be; and as the parallax and refraction act in oppoſite ways to one another, the former depreſſing and the latter raiſing the object, it is plain, that great difficulties muſt ariſe from this circumſtance. The ſun, for inſtance, whoſe parallax is leſs than the refraction, muſt always appear higher than he really is; but the moon, whoſe parallax is greater than her refraction, muſt always appear lower.

To render obſervations of the celeſtial bodies more eaſy, the commiſſioners of longitude have cauſed an Ephemeris or Nautical Almanack to be publiſhed annually, containing every requiſite for ſolving this important problem which can be put into the form of tables. But whatever may be done in this way, it will be neceſſary to make the neceſſary preparations concerning the dip of the horizon, the refraction, ſemidiameters, parallax, &c. in order to reduce the apparent to the true altitudes and diſtances; for which we ſhall here ſubjoin two general rules.

The principal obſervation for finding the longitude at ſea is that of the moon from the ſun, or from ſome remarkable ſtar near the zodiac. To do this, the operator muſt be furniſhed with a watch which can be depended upon for keeping time within a minute for ſix hours; and with a good Hadley's quadrant, or, which is preferable, a ſextant: and this laſt inſtrument will ſtill be more fit for the purpoſe if it be furniſhed with a ſcrew for moving the index gradually; likewiſe an additional dark glaſs, but not ſo dark as the common kind, for taking off the glare of the moon's light in obſerving her diſtance from a ſtar. A ſmall teleſcope, which may magnify three or four times, is alſo neceſſary to render the contact of a ſtar with the moon's limb more diſcernible. A magnifying glaſs of one and a half or two inches focus will likewiſe aſſiſt the operator in reading off his obſervations with the greater facility.

1. *To make the obſervation.* Having examined and adjuſted his inſtrument as well as poſſible, the obſerver is next to proceed in the following manner: If the diſtance of the moon from the ſun is to be obſerved, turn down one of the ſcreens; look at the moon directly through the tranſparent part of the horizon-glaſs; and keeping her in view, gently move the index till the ſun's image be brought into the ſilvered part of that glaſs. Bring the neareſt limbs of both objects into contact, and let the quadrant librate a little on the lunar ray; by which means the ſun will appear to riſe and fall by the ſide of the moon; in which motion the neareſt limbs muſt be made to touch one another exactly by moving the index. The obſervation is then made; and the diviſion coinciding with that on the Vernier ſcale, will ſhow the diſtance of the neareſt limbs of the objects.

When the diſtance of the moon from a ſtar is to be obſerved when the moon is very bright, turn down the lighteſt ſcreen, or uſe a dark glaſs lighter than the ſcreens, and deſigned for this particular purpoſe; look at the ſtar directly through the tranſparent part of the horizon-glaſs; and keeping it there, move the index till the moon's image is brought into the ſilvered part of the ſame glaſs. Make the quadrant librate gently on the ſtar's ray, and the moon will appear to riſe and fall by the ſtar: move the index between the librations, until the moon's enlightened limb is exactly touched by the ſtar, and then the obſervation is made. In theſe operations, the plane of the quadrant muſt always paſs through the two objects, the diſtance of which is to be obſerved; and for this purpoſe it muſt be placed in various poſitions according to the ſituation of the objects, which will ſoon be rendered eaſy by practice.

The obſervation being made, ſomebody at the very inſtant that the operator calls muſt obſerve by the watch the exact hour, minute, and quarter minute, if there be no ſecond hand, in order to find the apparent time; and at the ſame inſtant, or as quick as poſſible, two aſſiſtants muſt take the altitudes of thoſe objects the diſtance of which is obſerved; after which, the obſervations neceſſary for finding the longitude are completed.

The Ephemeris ſhows the moon's diſtance from the ſun, and likewiſe from proper ſtars, to every three hours of apparent time for the meridian of Greenwich; and that the greater number of opportunities of obſerving this luminary may be given, her diſtance is generally ſet down from at leaſt one object on each ſide of her. Her diſtance from the ſun is ſet down while it is between 40 and 120 degrees; ſo that, by means of a ſextant, it may be obſerved for two or three days after her firſt and before her laſt quarter. When the moon is between 40 and 90 degrees from the ſun, her diſtance is ſet down both from the ſun and from a ſtar on the contrary ſide: and, laſtly, when the diſtance is above 120 degrees, the diſtance is ſet down from two ſtars, one on each ſide of her. The diſtance of the moon from objects on the eaſt ſide of her is found in the Ephemeris in the 8th and 9th pages of the month; and her diſtance from objects on the weſt is found in the 10th and 11th pages of the month.

When the Ephemeris is uſed, the diſtance of the moon muſt only be obſerved from thoſe ſtars the diſtance of which is ſet down there; and theſe afford a ready means of knowing the ſtar from which her diſtance ought to be obſerved. The obſerver has then nothing more to do than to ſet his index to the diſtance roughly computed at the apparent time, eſtimated nearly for the meridian at Greenwich; after which he is to look to the eaſt or weſt of the moon, according as the diſtance of the ſtar is found in the 8th or 9th, or in the 10th or 11th, pages of the month; and having found the moon upon the horizon-glaſs, the ſtar will eaſily be found by ſweeping with the quadrant to the right or left, provided the air be clear and the ſtar be in the line of the moon's ſhorteſt axis produced. The time at Greenwich is eſtimated by turning into time the ſuppoſed longitude from that place, and adding it to the apparent time at the ſhip, or ſubtracting it from it as occaſion requires. The diſtance of the moon from the ſun, or a ſtar, is roughly found at this time, by ſaying, As 180 minutes (the number contained in three hours) is to the difference in minutes between this nearly eſtimated time and the next preceding time ſet down in the Ephemeris; ſo is the difference in minutes between the diſtance in the Ephemeris for the next preceding and next following times, to a number of minutes; which being added to the next preceding diſtance, or ſubtracted from it, according as it is increaſing or decreaſing, will give the diſtance nearly at the time the obſervation is to be made, and to which the index muſt be ſet.

An eaſier method of finding the angular diſtance is by bringing the objects nearly into contact in the common way, and then fixing the index tight to a certain degree and minute; waiting until the objects are nearly in contact, giving notice to the aſſiſtants to get ready with the altitudes, and when the objects are exactly in contact to call for the altitudes and the exact time by the watch. The obſerver may then prepare for taking another diſtance, by ſetting his index three or four minutes backwards or forwards, as the objects happen to be receding from or approaching to each other; thus proceeding to take the diſtance, altitudes, and time by the watch, as before. Thus the obſerver may take as many diſtances as he thinks proper; but four at the diſtance of three minutes, or three at the diſtance of four minutes, will at all times be ſufficient. Thus not only the eye of the obſerver will be leſs fatigued, but he will likewiſe be enabled to manage his inſtrument with much greater facility in every direction, a vertical one only excepted. If in taking the diſtances the middle one can be taken at any even diviſion on the arch, ſuch as a degree, or a degree and 20 or 40 minutes, that diſtance will be independent of the Nonius diviſion, and conſequently free of thoſe errors which frequently ariſe from the inequality of that diviſion in ſeveral parts of the graduated arch. The obſervation ought always to be made about two hours before or after noon; and the true time may be found by the altitude of the ſun taken at the preciſe time of the diſtance. If three diſtances are taken, then find the time by the altitude correſponding with the middle diſtance; and thus the obſervation will be ſecured from any error ariſing from the irregularity of the going of the watch. As the time, however, found by the altitude of a ſtar cannot be depended upon, becauſe of the uncertainty of the horizon in the night, the beſt way of determining the time for a night obſervation will be by two altitudes of the ſun; one taken on the preceding afternoon, before he is within ſix degrees of the horizon; and the other on the next morning, when he is more than ſix degrees high. It muſt be obſerved, however, that in order to follow theſe directions, it is neceſſary that the atmoſphere ſhould be pretty free from clouds; otherwiſe the obſerver muſt take the obſervations at ſuch times as he can beſt obtain them.

2. *To reduce the obſerved Diſtance of the Sun or a Star from the Moon to the true Diſtance.* 1. Turn the longitude into time, and add it to the time at the ſhip if the longitude be weſt, but ſubtract it if it be eaſt, which will give the ſuppoſed time at Greenwich; and this we may call *reduced time.* 2. Find the neareſt noon or midnight both before and after the reduced time in the ſeventh page of the month in the Ephemeris. 3. Take out the moon's ſemidiameter and horizontal parallaxes correſponding to theſe noons and midnights, and find their differences. Then ſay, As 12 hours is to the moon's ſemidiameter in 12 hours, ſo is the reduced time to a number of ſeconds; which, either added to or ſubtracted from the moon's ſemidiameter at the noon or midnight juſt mentioned, according as it is increaſing or decreaſing, will give her apparent ſemidiameter; to which add the correction from Table VIII. of the Ephemeris, and the ſum will be her true ſemidiameter at the reduced time. And as 12 hours is to the difference of the moon's horizontal parallax in 12 hours, ſo is the reduced time to a fourth number; which, being added to or ſubtracted from the moon's horizontal parallax at the noon or midnight before the reduced time, according as it is increaſing or decreaſing, the ſum or difference will be the moon's horizontal parallax at the reduced time. 4. If the reduced time be nearly any even part of 12 hours, viz. ⅙th, ¼th, &c. theſe parts of the difference may be taken, and either added or ſubtracted according to the directions already given, without being at the trouble of working by the rule of proportion. 5. To the obſerved altitude of the ſun's lower limb add the difference betwixt his ſemidiameter and dip; and that ſum will be his apparent altitude. 6. From the ſun's refraction take his parallax in altitude, and the remainder will be the correction of the ſun's altitude. 7. From the ſtar's obſerved altitude take the dip of the horizon, and the remainder will be the apparent altitude. 8. The refraction of a ſtar will be the correction of its altitude. 9. Take the difference between the moon's ſemidiameter and dip, and add it to the obſerved altitude if her lower limb was taken, or ſubtract it if her upper limb was taken; and the ſum or difference will be the apparent altitude of her centre. 10. From the proportional logarithm of the moon's horizontal parallax, taken out of the nautical almanack (increaſing its index by 10), take the logarithmic coſine of the moon's apparent altitude, the remainder will be the proportional logarithm of her parallax in altitude; from which take her refraction, and the remainder will be the correction of the moon's altitude. 11. To the obſerved diſtance of the moon from a ſtar add her ſemidiameter if the neareſt limb be taken, but ſubtract it if the fartheſt limb was taken, and the ſum or difference will be the apparent diſtance. 12. To the obſerved diſtance of the ſun and moon add both their ſemidiameters, and the ſum will be the apparent diſtance of their centres.

3. *To find the true Diſtance of the Objects, having their apparent Altitudes and Diſtance.* 1. To the proportional logarithm of the correction of the ſun or ſtar's altitude, add the logarithmic coſine of the ſun or ſtar's apparent altitude; the logarithmic ſine of the apparent diſtance of the moon from the ſun or ſtar; and the logarithmic coſecant of the moon's apparent altitude. The ſum of theſe, rejecting 30 from the index, will be the proportional logarithm of the firſt angle. 2. To the proportional logarithm of the correction of the ſun or ſtar's altitude, add the logarithmic cotangent of the ſun or ſtar's apparent altitude, and the logarithmic tangent of the apparent diſtance of the moon from the ſun or ſtar. The ſum of theſe, rejecting 20 in the index, will be the proportional logarithm of the ſecond angle. 3. Take the difference between the firſt and ſecond angles, adding it to the apparent diſtance if it be leſs than 90, and the firſt angle be greater than the ſecond; but ſubtracting it if the ſecond be greater than the firſt. If the diſtance be greater than 90, the ſum of the angles muſt be added to the apparent diſtance, which will give the diſtance corrected for the refraction of the ſun or ſtar. 4. To the proportional logarithm of the correction of the moon's altitude add the logarithmic coſine of her apparent altitude; the logarithmic ſine of the diſtance corrected for the ſun or ſtar's refraction and the logarithmic coſecant of the ſun's or ſtar's apparent altitude. The ſum, rejecting 30 in the index, will be the proportional logarithm of the third angle. 5. To the proportional logarithm of the correction of the moon's apparent altitude, add the logarithmic cotangent of her apparent altitude, and the tangent of the diſtance corrected for the ſun or ſtar's refraction; their ſum, rejecting 20 in the index, will be the proportional logarithm of the fourth angle. 6. Take the difference between the third and fourth angles, and ſubtract it from the diſtance corrected for the ſun or ſtar's refraction if leſs than 90, and the third angle be greater than the fourth; or add it to the diſtance if the fourth angle be greater than the third: but if the diſtance be more than 90, the ſum of the angles muſt be ſubtracted from it, to give the diſtance corrected for the ſun or ſtar's refraction, and the principal effects of the moon's parallax. 7. In Table XX. of the Ephemeris, look for the diſtance corrected for the ſun and ſtar's refraction, and the moon's parallax in the top column, and the correction of her altitude in the left-hand ſide column; take out the number of ſeconds that ſtand under the former, and oppoſite to the latter. Look again in the ſame table for the corrected diſtance in the top column, and the principal effects of the moon's parallax in the left-hand ſide column, and take out the number of ſeconds. The difference between theſe two

numbers muſt be added to the corrected diſtance if leſs than 90, but ſubtracted from it if greater; and the ſum or difference will be the true diſtance.

4. *To determine the Longitude after having obtained the true Diſtance.* Look in the Ephemeris among the diſtances of the objects for the computed diſtance betwixt the moon and the other object obſerved on the given day. If it be found there, the time at Greenwich will be at the top of the column; but if it falls between two diſtances in the Ephemeris which ſtand immediately before and after it, and alſo the difference between the diſtance ſtanding before and the computed diſtance; then take the proportional logarithms of the firſt and ſecond differences, and the difference between theſe two logarithms will be the proportional logarithm of a number of hours, minutes, and ſeconds; which being added to the time ſtanding over the firſt diſtance, will give the true time at Greenwich. Or it may be found by ſaying, As the firſt difference is to three hours, ſo is the ſecond difference to a proportional part of time: which being added as above directed, will give the time at Greenwich. The difference between Greenwich time and that at the ſhip, turned into longitude, will be that at the time the obſervations were made; and will be eaſt if the time at the ſhip is greateſt, but weſt if it is leaſt.

Having given theſe general directions, we ſhall next proceed to ſhow ſome particular examples of finding the longitude at ſea by all the different methods in which it is uſually tried.

1. *To find the Longitude by Computation from the Ship's Courſe.*—Were it poſſible to keep an accurate account of the diſtance the ſhip has run, and to meaſure it exactly by the log * or any other means, then both latitude and longitude would eaſily be found by ſettling the ſhip's account to that time. For the courſe and diſtance being known, the difference of latitude and departure is readily found by the Traverſe Table: and the difference of longitude being known, the true longitude and latitude will alſo be known. A variety of cauſes, however, concur to render this computation inaccurate; particularly the ſhip's continual deflection from the courſe ſet by her playing to the right and left round her centre of gravity: the unequal care of thoſe at the helm, and the diſtance ſuppoſed to be ſailed being erroneous, on account of ſtormy ſeas, unſteady winds, currents, &c. for which it ſeems impoſſible to make any allowance. The place of the ſhip, however, is judged of by finding the latitude every day, if poſſible, by obſervations; and if the latitude found by obſervation agrees with that by the reckoning, it is preſumed that the ſhip's place is properly determined; but if they diſagree, it is concluded that the account of the longitude ſtands in need of correction, as the latitude by obſervation is always to be depended upon.

Currents very often occaſion errors in the computation of a ſhip's place. The cauſes of theſe in the great depths of the ocean are not well known, though many of the motions near the ſhore can be accounted for. It is ſuppoſed that ſome of thoſe in the great oceans are owing to the tide following the moon, and a certain libration of the waters ariſing from thence; likewiſe that the unſettled nature of theſe currents may be owing to the changes in the moon's declination. In the torrid zone, however, a conſiderable current is occaſioned by the trade winds, the motion being conſtantly to the weſt, at the rate of eight or ten miles per day. At the extremities of the trade winds or near the 30th degree of north or ſouth latitude, the currents are probably compounded of this motion to the weſtward, and of one towards the equator; whence all ſhips ſailing within theſe limits ought to allow a courſe each day for the current.

When the error is ſuppoſed to have been occaſioned by a current, it ought if poſſible to be tried whether the caſe is ſo or not; or we muſt make a reaſonable eſtimate of its drift and courſe. Then with the ſetting and drift, as a courſe and diſtance, find the difference of latitude and departure; with which the dead reckoning is to be increaſed or diminiſhed; and if the latitude thus corrected agrees with that by obſervation, the departure thus corrected may be ſafely taken as true, and thus the ſhip's place with regard to the longitude determined.

Exam. Suppoſe a ſhip in 24 hours finds, by her dead reckoning, that ſhe has made 96 miles of difference of latitude north and 38 miles of departure weſt; but by obſervation finds her difference of latitude 112, and on trial that there is a current which in 24 hours makes a difference of 16 miles latitude north and 10 miles of departure eaſt: Required the ſhip's departure.

	Miles.		*Miles.*
Diff. lat. by account	96 N.	Departure by account	38 W.
Diff. lat. by current	16 N.	Departure by current	10
True diff. lat.	112		28 W.

Here the dead reckoning corrected by the current gives the difference of latitude 112 miles, which is the ſame as that found by obſervation; whence the departure 28 is taken as the true one.

When the error is ſuppoſed to ariſe from the courſes and diſtances, we muſt obſerve, that if the difference of latitude is much more than the departure, or the direct courſe has been within three points of the meridian, the error is moſt probably in the diſtance. But if the departure be much greater than the difference of latitude, or the direct courſe be within three points of the parallel, or more than five points from the meridian, the error is probably to be aſcribed to the courſe. But if the courſes in general are near the middle of the quadrant, the error may be either in the courſe, or in the diſtance, or both. This method admits of three caſes.

1. When, by the dead reckoning, the difference of latitude is more than once and a half the departure; or when the courſe is leſs than three points: Find the courſe to the difference of latitude and departure. With this courſe and the meridional difference of latitude by obſervation, find the difference of longitude.

2. When the dead reckoning is more than once and a half the difference of latitude; or when the courſe is more than five points: Find the courſe and diſtance, with the difference of latitude by obſervation, and departure by account; then with the co-middle latitude by obſervation, and departure by account, find the difference of longitude.

3. When

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* See Log, *Perpetual*.

3. When the difference of latitude and departure by account is nearly equal, or the direct courſe is between three and five points of the meridian: Find the courſe with the difference of latitude and departure by account ſince the laſt obſervation. With this courſe and the difference of latitude by obſervation find another departure. Take half the ſum of theſe departures for the true one. With the true departure and difference of latitude by obſervation find the true courſe; then with the true courſe and meridional difference of latitude find the difference of longitude.

2. *To find the Longitude at Sea by a Variation-chart.*—Dr Halley having collected a great number of obſervations on the variation of the needle in many parts of the world; by that means was enabled to draw certain lines on Mercator's chart, ſhewing the variation in all the places over which they paſſed in the year 1700, at which time he firſt publiſhed the chart; whence the longitude of thoſe places might be found by the chart, provided its latitude and variation were given. The rule is, Draw a parallel of latitude on the chart through the latitude found by obſervation; and the point where it cuts the curved line marked with the variation that was obſerved will be the ſhip's place.

EXAM. A ſhip finds by obſervation the latitude to be 18° 20′ north, and the variation of the compaſs to be 4° weſt. Required the ſhip's place.—Lay a ruler over 18° 20′ north parallel to the equator; and the point where its edge cuts the curve of 4° weſt variation gives the ſhip's place, which will be found in about 27° 10′ weſt from London.

This method of finding the longitude, however, is attended with two inconveniences. 1. That when the variation lines run eaſt or weſt, or nearly ſo, it cannot be applied; though as this happens only in certain parts of the world, a variation chart may be of great uſe for the reſt. Even in thoſe places indeed where the variation curves do run eaſt or weſt, they may be of conſiderable uſe in correcting the latitude when meridian obſervations cannot be had; which frequently happens on the northern coaſts of America, the Weſtern ocean, and about Newfoundland; for if the variation can be found exactly, the eaſt and weſt curve anſwering to it will ſhow the latitude. But, 2. The variation itſelf is ſubject to continual change; whence a chart, though ever ſo perfect at firſt, muſt in time become totally uſeleſs; and hence the charts conſtructed by Dr Halley, though of great utility at their firſt publication, became at length almoſt entirely uſeleſs. A new one was publiſhed in 1746 by Meſſrs Mountaine and Dodſon, which was ſo well received, that in 1756 they again drew variation lines for that year, and publiſhed a third chart the year following. They alſo preſented to the Royal Society a curious paper concerning the variation of the magnetic needle, with a ſet of tables annexed, containing the reſult of more than 50,000 obſervations, in ſix periodical reviews from the year 1700 to 1756 incluſive, adapted to every five degrees of latitude and longitude in the more frequented oceans; all of which were publiſhed in the Philoſophical Tranſactions for 1757.

3. *To find the Longitude by the Sun's Declination.*—Having made ſuch obſervations on the ſun as may enable us to find his declination at the place, take the difference between this computed declination and that ſhown at London by the Ephemeris; from which take alſo the daily difference of declination at that time; then ſay, as the daily difference of declination is to the above found difference, ſo is 360 degrees to the difference of longitude. In this method, however, a ſmall error in the declination will make a great one in the longitude.

4. *To find the Longitude by the Moon's culminating.*—Seek in the Ephemeris for the time of her coming to the meridian on the given day and on the day following, and take their difference; alſo take the difference betwixt the times of culminating on the ſame day as found in the ephemeris and as obſerved; then ſay, as the daily difference in the ephemeris is to the difference between the ephemeris and obſervation; ſo is 360 degrees to the difference of longitude. In this method alſo a ſmall difference in the culmination will occaſion a great one in the longitude.

5. *By Eclipſes of the Moon.*—This is done much in the ſame manner as by the eclipſes of Jupiter's ſatellites: For if, in two or more diſtant places where an eclipſe of the moon is viſible, we carefully obſerve the times of the beginning and ending, the number of digits eclipſed, or the time when the ſhadow touches ſome remarkable ſpot, or when it leaves any particular ſpot on the moon, the difference of the times when the obſervations were made will give the difference of longitude. Phenomena of this kind, however, occur too ſeldom to be of much uſe.

6. In the 76th volume of the Philoſophical Tranſactions, Mr Edward Pigot gives a very particular account of his method of determining the longitude and latitude of York; in which he alſo recommends the method of determining the longitude of places by obſervations of the *moon's tranſit over the meridian*. The inſtruments uſed in his obſervations were a gridiron pendulum clock, a two feet and a half reflector, an eighteen inch quadrant made by Mr Bird, and a tranſit inſtrument made by Mr Siſſon.

By theſe inſtruments an obſervation was made, on the 10th of September 1783, of the occultation of a ſtar of the ninth magnitude by the moon, during an eclipſe of that planet, at York and Paris. Beſides this, there were obſervations made of the immerſions of φ *Aquarii* and δ *Piſcium*; the reſult of all which was, that between Greenwich and York the difference of meridians was 4′ 27″.

In 1783, Mr Pigot informs us, that he thought of finding the difference of meridians by obſerving the meridian right aſcenſions of the moon's limb. This he thought had been quite original: but he found it afterwards in the Nautical Almanack for 1769, and in 1784 read a pamphlet on the ſame ſubject by the abbé Toaldo; but ſtill found that the great exactneſs of this method was not ſuſpected; though he is convinced that it muſt ſoon be univerſally adopted in preference to that from the firſt ſatellite of Jupiter.

After giving a number of obſervations on the ſatellites of Jupiter, he concludes, that the exactneſs expected from obſervations, even on the firſt ſatellite, is much over-rated. "Among the various objections (ſays he), there is one I have often experienced, and which proceeds ſolely from the diſpoſition of the eye, that of ſeeing more diſtinctly at one time than another. It may not be improper alſo to mention, that the obſervation I ſhould have relied on as the beſt, that of Auguſt 30. 1785, marked *excellent*, is one of thoſe moſt diſtant from the truth."

After giving a number of obſervations on the eclipſe of the moon September 10. 1783, our author concludes, that the eclipſes of the moon's ſpots are in general too much neglected, and that it might be relied upon much more were the following circumſtances attended to: 1. To be particular in ſpecifying the clearneſs of the ſky. 2. To chooſe ſuch ſpots as are well defined, and leave no heſitation as to the part eclipſed. 3. That every obſerver ſhould uſe, as far as poſſible, teleſcopes equally powerful, or at leaſt let the magnifying powers be the ſame. "A principal objection (ſays he) may ſtill be urged, viz. the difficulty of diſtinguiſhing the true ſhadow from the penumbra. Was this obviated, I believe the reſults would be more exact than from Jupiter's firſt ſatellite: Undoubtedly the ſhadow appears better defined if magnified little; but I am much inclined to think, that, with high magnifying powers, there is greater certainty of chooſing the ſame part of the ſhadow, which perhaps is more than a ſufficient compenſation for the loſs of diſtinctneſs."

The following rule for meridian obſervations of the moon's limb is next laid down: "The increaſe of the moon's right aſcenſion in twelve hours (or any given time found by computation), is to 12 hours as the increaſe of the moon's right aſcenſion between two places found by obſervation is to the difference of meridians.

Example.

November 30. 1782.

h.	′	″		
13	12	57.62	Meridian tranſit of moon's ſecond limb	By clock at Greenwich.
13	13	29.08	Ditto of α ♍	
		31.46	Difference of right aſcenſion.	
13	14	8.05	Meridian tranſit of moon's ſecond limb	By clock at York.
13	14	30.13	Ditto of α ♍	
		32.08	Difference at York	The clocks going nearly ſidereal time, no correction is required.
		31.46	Difference at Greenwich,	
		9.38	Increaſe of the moon's apparent right aſcenſion between Greenwich and York, by obſervation.	

141″ in ſeconds of a degree, ditto, ditto, ditto.

The increaſe of the moon's right aſcenſion for 12 hours, by computation, is 23,340 ſeconds; and 12 hours reduced into ſeconds is 43,200. Therefore, according to the rule ſtated above,

$$23,340'' : 141'' :: 43,200'' : \text{diff. of merid.} = 261''$$

"Theſe eaſy obſervations and ſhort reduction (ſays Mr Pigot) are the whole of the buſineſs. Inſtead of computing the moon's right aſcenſion for 12 hours, I have conſtantly taken it from the Nautical Almanacks, which give it ſufficiently exact, provided ſome attention be paid to the increaſe or decreaſe of the moon's motion. Were the following circumſtances attended to, the reſults would be undoubtedly much more exact.

"1. Compare the obſervations with the ſame made in ſeveral other places. 2. Let ſeveral and the ſame ſtars be obſerved at theſe places. 3. Such ſtars as are neareſt in right aſcenſion and declination to the moon are infinitely preferable. 4. It cannot be too ſtrongly urged, to get, as near as poſſible, an equal number of obſervations of each limb, to take a mean of each ſet, and then a mean of both means. This will in a great meaſure correct the error of teleſcopes and ſight. 5. The adjuſtment of the teleſcopes to the eye of the obſerver before the obſervation is alſo very neceſſary, as the ſight is ſubject to vary. 6. A principal error proceeds from the obſervation of the moon's limb, which may be conſiderably leſſened, if certain little round ſpots near each limb were alſo obſerved in ſettled obſervatories; in which caſe the libration of the moon will perhaps be a conſideration. 7. When the difference of meridians, or of the latitudes of places, is very conſiderable, the change of the moon's diameter becomes an equation.

"Though ſuch are the requiſites to uſe this method with advantage, only one or two of them have been employed in the obſervations that I have reduced. Two thirds of theſe obſervations had not even the ſame ſtars obſerved at Greenwich and York; and yet none of the reſults, except a doubtful one, differ 15″ from the mean; therefore I think we may expect a ſtill greater exactneſs, perhaps within 10″, if the above particulars be attended to.

"When the ſame ſtars are not obſerved, it is neceſſary for the obſervers at both places to compute their right aſcenſion from tables, in order to get the apparent right aſcenſion of the moon's limb. Though this is not ſo ſatisfactory as by actual obſervation, ſtill the difference will be trifling, provided the ſtar's right aſcenſions are accurately ſettled. I am alſo of opinion, that the ſame method can be put in practice by travellers with little trouble, and a tranſit inſtrument, conſtructed ſo as to fix up with facility in any place. It is not neceſſary, perhaps, that the inſtrument ſhould be perfectly in the meridian for a few ſeconds of time, provided ſtars, nearly in the ſame parallel of declination with the moon, are obſerved; nay, I am inclined to think, that if the inſtrument deviates even a quarter or half a degree, or more, ſufficient exactneſs can be attained; as a table might be computed, ſhowing the moon's parallax and motion for ſuch deviation; which laſt may eaſily be found by the well-known method of obſerving ſtars whoſe difference of declination is conſiderable.

"As travellers very ſeldom meet with ſituations to obſerve ſtars near the pole, or find a proper object for determining the error of the line of collimation, I ſhall recommend the following method as original.—Having computed the apparent right aſcenſion of four, ſix, or more ſtars, which have nearly the ſame parallel of declination, obſerve half of them with the inſtrument inverted, and the other half when in its right poſition. If the difference of right aſcenſions between each ſet by obſervation agrees with the computation, there is no error; but if they diſagree, half that diſagreement is the error of the line of collimation. The ſame obſervations may alſo ſerve to determine,

mine, whether the diſtances of the correſponding wires are equal. In caſe of neceſſity, each limb of the ſun might be obſerved in the ſame manner, though probably with leſs preciſion. By a ſingle trial I made above two years ago, the reſult was much more exact than I expected. Mayer's catalogue of ſtars will prove of great uſe to thoſe that adopt the above method.—I am rather ſurpriſed that the immerſions of known ſtars of the ſixth and ſeventh magnitude, behind the dark limb of the moon, are not conſtantly obſerved in fixed obſervatories, as they would frequently be of great uſe.

The annexed rule for finding the ſhip's place, with the miſcellaneous obſervations on different methods, were drawn up by Mr John M'Lean of Edinburgh.

1. With regard to determining the ſhip's place by the help of the courſe and diſtance ſailed, the following rule may be applied.—It will be found as expeditious as any of the common methods by the middle latitude or meridional parts; and is in ſome reſpects preferable, as the common tables of ſines and tangents only are requiſite in applying it.—Let a and b be the diſtances of two places from the ſame pole in degrees, or their complete latitude; c the angle which a meridian makes with the rhumb line paſſing through the places; and L the angle formed by their meridians, or the difference of longitude in minutes: then A and B being the logarithmic tangents of $\frac{1}{2}a$ and $\frac{1}{2}b$, S the ſine of C, and S the ſine of $(C+1')$, we ſhall have the following equation: $L=\frac{A \backsim B}{S'-S'}$, (A). Alſo, from a well known property of the rhumb line, we have the following equation:

$S+E=R+D$, where S is the logarithmic coſine of C, E the logarithm of the length of the rhumb line, or diſtance, D the logarithm of the minute's difference of latitude, and R the logarithm of the radius.

By the help of theſe two equations, we ſhall have an eaſy ſolution of the ſeveral caſes to which the middle latitude, or meridional parts, are commonly applied.

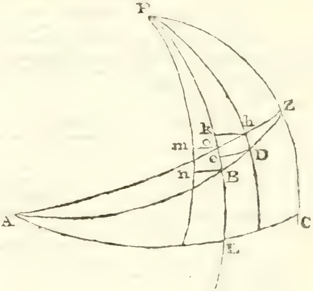
EXAM. A ſhip from a port in latitude 56° N. ſails S. W. by W. till ſhe arrives at the latitude of 40° N; Required the difference of longitude?

Here $a=34°$, $b=50°$, $c=56°\ 15''$, $A=9.48534$, $B=9.56107$, $S'=9.9199308$, $S=9.9198464$; therefore, $L=\frac{A \backsim B}{S'-S}=\frac{757300}{844}=897$ the minutes difference of longitude. Alſo, $S=9.74474$, $D=2.98227$; therefore $E=R+D-S=3.23753$, to which the natural number is 1728, the miles in the rhumb line ſailed over.

2. The common method of finding the difference of longitude made good upon ſeveral courſes and diſtances, by means of the difference of latitude and departure made good upon the ſeveral courſes, is not accurately true.

For example: If a ſhip ſhould ſail due ſouth 600 miles, from a port in 60° north latitude, and then due weſt 600 miles, the difference of longitude found by the common methods of ſolution would be 1053; whereas the true difference of longitude is only 933, leſs than the former by 120 miles, which is more than one eighth of the whole. Indeed, every conſiderable alteration in the courſe will produce a very ſenſible error in the difference of longitude. Though, when the ſeveral rhumb lines ſailed over are nearly in the ſame direction, the error in longitude will be but ſmall.

The reaſon of this will eaſily appear from the annexed figure, in which the ſhip is ſuppoſed to ſail from Z to A, along the rhumb lines ZB, BA; for if the meridians PZ, PkoeBL be drawn; and very near the latter other two meridians PhD, Pmn; and likewiſe the parallels of latitude Bn, De, mo, hk; then it is plain that De is greater than hk (for De is to hk as the ſine of DP to the ſine of hP): and ſince this is the caſe everywhere, the departure correſponding to the diſtance BZ and courſe BZC, will be greater than the departure to the diſtance oZ and courſe oZC. And in the ſame manner, we prove that nB is greater than mo; and conſequently, the departure correſponding to the diſtance AB, and courſe ABL, is greater than the departure to the diſtance Ao, and courſe AoL. Wherefore, the ſum of the two departures correſponding to the courſes ABL and BZC, and to the diſtances AB and BZ, is greater than the departure correſponding to the diſtance AZ and courſe AZC: therefore the courſe anſwering to this ſum as a departure, and CZ as a difference of latitude, (AC being the parallel of latitudes paſſing through A), will be greater than the true courſe AZC made good upon the whole. And hence the difference of longitude found by the common rules will be greater then the true difference of longitudes; and the error will be greater or leſs according as BA deviates more or leſs from the direction of BZ.



3. Of determining the ſhip's longitude by lunar obſervations.

Several rules for this purpoſe have been lately publiſhed, the principal object of which ſeems to have been to

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(A) $A \backsim B$ ſignifies the difference between A and B.

to abbreviate the computations requiſite for determining the true diſtance of the ſun or ſtar from the moon's centre. This, however, ſhould have certainly been leſs attended to than the inveſtigation of a ſolution, in which conſiderable errors in the data may produce a ſmall error in the required diſtance. When either of the luminaries has a ſmall elevation, its altitude will be affected by the variableneſs of the atmoſphere; likewiſe the altitude, as given by the quadrant, will be affected by the inaccuracy of the inſtrument, and the uncertainty neceſſarily attending all obſervations made at ſea. The ſum of theſe errors, when they all tend the ſame way, may be ſuppoſed to amount to at leaſt one minute in altitude; which, in many caſes, according to the common rules for computing the true diſtance, will produce an error of about 30 minutes in the longitude. Thus, in the example given by Monſ. Callet, in the *Tables Portatives*, if we ſuppoſe an error of one minute in the ſun's altitude, or call it 6° 26′ 34″, inſtead of 6° 27′ 34″; we ſhall find the alteration in diſtance according to his rule to be 54″, producing an error of about 27 minutes in the longitude; for the angle at the ſun will be found, in the ſpherical triangle whoſe ſides are the complement of the ſun's altitude, complement of the moon's altitude, and obſerved diſtance, to be about 26°; and as radius is to the coſine of 26°, ſo is 16 the ſuppoſed error in altitude, to 54″ the alteration in diſtance. Perhaps the only method of determining the diſtance, ſo as not to be affected by the errors of altitude, is that by firſt finding the angles at the ſun and moon, and by the help of them the corrections of diſtance for parallax and refraction. The rule is as follows:

Add together the complement of the moon's apparent altitude, the complement of the ſun's apparent altitude, and the apparent diſtance of centres; from half the ſum of theſe ſubſtract the complement of the ſun's altitude, and add together the logarithmic coſecant of the complement of the moon's altitude, the logarithmic coſecant of the apparent diſtance of centres, the logarithmic ſine of the half ſum, and the logarithmic ſine of the remainder; and half the ſum of theſe four logarithms, after rejecting 20 from the index, is the logarithmic coſine of half the angle at the moon.

As radius is to the coſine of the angle at the moon; ſo is the difference between the moon's parallax and refraction in altitude to a correction of diſtance; which is to be added to the apparent diſtance of centres when the angle at the moon is obtuſe; but to be ſubtracted when that angle is acute, in order to have the diſtance once corrected.

In the above formula, if the word *ſun* be changed for *moon*, and *vice verſa*, wherever theſe terms occur, we ſhall find a ſecond correction of diſtance to be applied to the diſtance, once corrected by ſubtraction when the angle at the ſun is obtuſe, but by addition when that angle is acute, and the remainder or ſum is the true diſtance nearly.

In applying this rule, it will be ſufficient to uſe the complement, altitude, and apparent diſtances of centres, true to the neareſt minute only, as a ſmall error in the angles at the ſun and moon will very little affect the corrections of diſtances.

If D be the computed diſtance in ſeconds, d the difference between the moon's parallax and refraction in altitude, S the ſine of the angle at the moon, and R the radius; then $\frac{d^2\, S^2}{2DR}$ will be the third correction of diſtance, to be added to the diſtance twice corrected: But it is plain, from the nature of this correction, that it may be always rejected, except when the diſtance D is very ſmall, and the angle at the moon nearly equal to 90°.

This ſolution is likewiſe of uſe in finding the true diſtance of a ſtar from the moon, by changing the word *ſun* into *ſtar*, and uſing the refraction of the ſtar, inſtead of the difference between the refraction and parallax in altitude of the ſun, in finding the ſecond correction of diſtance.

Ex. Given the obſerved diſtance of a ſtar from the centre of the moon, 50° 8′ 41″; the moon's altitude, 55° 58′ 5″; the ſtar's altitude, 19° 18′ 5″; and the moon's horizontal parallax, 1° 0′ 5″: Required the true diſtance.

Coſec.——0.02512——*'s co. alt.——70° 42′

☽'s co. alt.——34 4————Coſec.——0.25169

Coſec.——0.11479——obſ. diſt.——50 9————Coſec.——0.11479

2)154 55

Sine——9.98950 —— —— 77 27————Sine——9.98950

Rem. 6 45————Sine——9.07018

Sine——9.83688 —— Rem. 43 23 2)19.42616

2)19.96629 ————Coſec.——9.71308——58° 54′
2

Coſec.——9.98314—— 15° 54′———— 117 48=☽'s angle.
2

31 48=*'s angle.

Rad. : Coſec. 117° 48′ : : ☽'s diff. parall. & refract. 1980″ : 923″= 1ſt correct. of diſtance.

Rad. : Coſec. 31° 48′ : ſtar's refract. 162″ : 138″= 2d correct. of diſtance.

Here the firſt correction of diſtance is additive, ſince the angle at the moon is obtuſe; and the ſecond correction is alſo additive, ſince the angle at the ſtar is acute: therefore their ſum $923''+138'=1061''=17'\,41''$, being added to $50°\,8'\,41''$, the apparent diſtance of the ſtar from the moon's centre, gives $50°\,26'\,21''$ for the true diſtance of centres nearly;—and $2\times L\,(d+S)-L\,(2\,L\,R+L\,2+L\,D)=L\,8'$, which, being added to the diſtance twice corrected, gives $50°\,26'\,29''$ for the true diſtance. By comparing this diſtance with the computed diſtances in the ephemeris, the time at Greenwich correſponding to that of obſerving the diſtance will be known; and the difference of thoſe times being converted into degrees and minutes, at the rate of 15 degrees to the hour, will give the longitude of the place of obſervation; which will be eaſt if the time at the place be greater than that at Greenwich, but weſt if it be leſs.

LONGITUDINAL, in general, denotes ſomething placed lengthwiſe: thus ſome of the fibres in the veſſels of the human body are placed longitudinally, others tranſverſely or acroſs.

LONGOBARDI. See LOMBARDS.

LONGOMONTANUS, CHRISTIAN, a learned aſtronomer, born in a village of Denmark in 1562. He was the ſon of a ploughman; and was obliged to ſuffer during his ſtudies all the hardſhips to which he could be expoſed, dividing his time, like the philoſopher Cleanthes, between the cultivation of the earth and the leſſons he received from the miniſter of the place. At laſt, when he was 15, he ſtole away from his family, and went to Wiburg, where there was a college, in which he ſpent 11 years; and though he was obliged to earn a livelihood, he applied himſelf to ſtudy with ſuch ardour, that among other ſciences he learned the mathematics in great perfection. He afterwards went to Copenhagen; where the profeſſors of that univerſity in a ſhort time conceived ſo high an opinion of him, that they recommended him to the celebrated Tycho Brahe. Longomontanus lived eight years with that famous aſtronomer, and was of great ſervice to him in his obſervations and calculations. At length, being extremely deſirous of obtaining a profeſſor's chair in Denmark, Tycho Brahe conſented, though with ſome difficulty, to deprive himſelf of his ſervice; gave him a diſcharge, filled with the higheſt teſtimonies of his eſteem; and furniſhed him with money for the expence of his long journey. He obtained a profeſſorſhip of mathematics in the univerſity of Copenhagen in 1605; and diſcharged the duty of it worthily till his death, which happened in 1647. He wrote many learned works; amuſed himſelf with endeavouring to ſquare the circle, and pretended that he had made that diſcovery; but Dr John Pell, an Engliſh mathematician, attacked him warmly on that ſubject, and proved that he was miſtaken.

LONGTOWN, a town of Cumberland, on the Scots borders, near the conflux of the Eſk and Kirkſop, 10 miles from Carliſle, and 313 miles from London; it has a market on Thurſday, and a charity ſchool for 60 children, with two fairs in the year.

LONGUEVILLE, a town of France, in the department of Lower Seine, and in the territory of Caux, ſeated on the ſmall river Lee, 17 miles north of Rouen. It has the title of a duchy. E. Long. 1. 10. N. Lat. 49. 46.

LONGWY, a town of France, in the department of Moſelle, with a caſtle, divided into the old and new towns. This laſt was built and fortified by Louis XIV. It is ſeated on an eminence. It was taken by the king of Pruſſia in 1792, but retaken two months after. E. Long. 5. 58. N. Lat. 49. 32.

LONGUS, a Greek ſophiſt, author of a book entitled Ποιμενικα, or Paſtorals, or a romance containing the loves of Daphnis and Chloe. Huetius, biſhop of Avranches, ſpeaks very advantageouſly of this work; but he cenſures the obſcene touches with which it is interſperſed. None of the ancient authors mention him, ſo that the time when he lived cannot be certainly fixed. There is an Engliſh tranſlation of this author, which is aſcribed to Mr J. Craggs, once ſecretary of ſtate.

LONICERA, HONEYSUCKLE, a genus of plants belonging to the pentandria claſs. See BOTANY *Index*.

LONSDALE, or *Kirkby* LONSDALE, a town of Weſtmorland, ſeated on the river Lon, in a pleaſant and rich valley of the ſame name. It is a large well built town, has a handſome church, and a fine ſtone bridge over the river. It is well inhabited; and is the beſt town in the county except Kendal. It gives title of earl to the Lowther family. W. Long. 2. 27. N. Lat. 54. 10.

LOO, a town of the United Provinces, in Guelderland, eight miles weſt of Deventer, where the prince of Orange has a fine palace. E. Long. 6. 0. N. Lat. 52. 18.

LOOF, the after part of a ſhip's bow; or that part of her ſide forward where the planks begin to be incurvated into an arch as they approach the ſtem.

LOOF, or *Luff*. See LUFF.

LOOK-OUT, in the ſea-language, a watchful attention to ſome important object or event which is expected to ariſe from the preſent ſituation of a ſhip, &c. It is principally uſed in navigation when there is a probability of danger from the real or ſuppoſed proximity of land, rocks, enemies, and, in ſhort, whatever peril ſhe may encounter through inattention, which might otherwiſe have been avoided by a prudent and neceſſary vigilance.

There is always a look-out kept on a ſhip's forecaſtle at ſea, to watch for any dangerous objects lying near her track, and to which ſhe makes a gradual approach as ſhe advances: the mate of the watch accordingly calls often from the quarter-deck, "Look out afore there!" to the perſons appointed for this ſervice.

LOOKING-GLASSES, are nothing but plain mirrors of glaſs; which, being impervious to the light, reflect the images of things placed before them. See the articles MIRROR and OPTICS.

For the caſting, grinding, and poliſhing of looking-glaſſes, ſee the article GLASS.

For foliating of looking-glaſſes. See the article FOLIATING.

LOOL, in *Metallurgy*, a veſſel made to receive the waſhings of ores of metals. The heavier or more metalline parts of the ores remain in the trough in which they are waſhed; the lighter and more earthy run off with the water, but ſettle in the lool.

LOOM, the weaver's frame; a machine whereby ſeveral diſtinct threads are woven into one piece.

Looms are of various ſtructures, accommodated to the various kinds of materials to be woven, and the various manner of weaving them; viz. for woollens, ſilks, linens, cottons, cloths of gold, and other works, as tapeſtry, ribbands, ſtockings, &c. divers of which will be found under their proper heads. See WEAVING.

The weaver's loom-engine, otherwiſe called the Dutch loom-engine, was brought into uſe from Holland to London, in or about the year 1676.

Heir-Loom, in *Law*. See *Heir-Loom*.

LOOM, at ſea. If a ſhip appears big, when at a diſtance, they ſay ſhe looms, or appears a great ſail: the term is alſo uſed to denote the indiſtinct appearance of any other diſtant objects.

Loom-gale, at ſea, a gentle eaſy gale of wind, in which a ſhip can carry her top-ſails a-trip.

LOOP, in the iron works, is a part of a ſow or block of caſt iron broken or melted off from the reſt, and prepared for the forge or hammer. The uſual method is, to break off the loop of about three quarters of a hundred weight. This loop they take up with their flinging-tongs, and beat it with iron ſledges upon an iron plate near the fire, that ſo it may not fall to pieces, but be in a condition to be carried under the hammer. It is then placed under the hammer, and a little water being drawn to make the hammer move but ſoftly, it is beat very gently, and by this means the droſs and foulneſs are forced off; and after this they draw more and more water by degrees, and beat it more and more till they bring it to a four-ſquare maſs, of about two feet long, which they call a bloom.

LOOPING, in *Metallurgy*, a word uſed by the miners of ſome counties of England, to expreſs the running together of the matter of an ore into a maſs, in the roaſting or firſt burning, intended only to calcine it ſo far as to make it fit for powdering. This accident, which gives the miners ſome trouble, is generally owing to the continuing the fire too long in this proceſs.

LOOSE-STRIFE. See LYSIMACHIA, BOTANY *Index*.

LOPEZ DE VEGA. See VEGA.

LOPEZ, or *Indian Root*, in the *Materia Medica*. The plant to which this article belongs is unknown. Neither the woody nor cortical part of the root has any remarkable ſenſible quality. A ſlight bitterneſs is perceptible; and it is recommended, like ſimarouba, in diarrhœas even of the colliquative kind, in half-dram doſes four times a-day. Little of this root has been brought to Europe: but ſome of thoſe who have had an opportunity of employing it, ſpeak in very high terms of the effects obtained from it.

LOPHIUS, FISHING-FROG, *Toad-fiſh*, or *Sea-devil*; a genus of the branchioſtegous order of fiſhes. See ICHTHYOLOGY *Index*.

LORANTHUS, a genus of plants belonging to the hexandria claſs, and in the natural method ranking under the 48th order, *Aggregatæ*. See BOTANY *Index*.

LORARII, among the Romans, officers whoſe buſineſs it was, with whips and ſcourges, to compel the gladiators to engage. The *lorarii* alſo puniſhed ſlaves who diſobeyed their maſters.

LORD, a title of honour given to thoſe who are noble either by birth or creation. In this ſenſe, it amounts to much the ſame as *peer of the realm*, or *lord of parliament*. The title is by courteſy alſo given to all the ſons of dukes and marquiſes, and to the eldeſt ſons of earls: and it is alſo a title of honour beſtowed on thoſe who are honourable by their employments; as *lord advocate*, *lord chamberlain*, *lord chancellor*, *&c.* The word is Saxon, but abbreviated from two ſyllables into one; for it was originally *Hlaford*, which by dropping the aſpiration became *Laford*, and afterwards by contraction *Lord*. "The etymology of the word (ſays J. Coates) is well worth obſerving; for it was compoſed of *hlaf* "a loaf of bread," and *ford* "to give or afford;" ſo that *Hlaford*, now *Lord*, implies "a giver of bread;" becauſe, in thoſe ages, ſuch great men kept extraordinary houſes, and fed all the poor; for which reaſon they were called *givers of bread*, a thing now much out of date, great men being fond of retaining the title, but few regarding the practice for which it was firſt given. See LADY.

Houſe of LORDS, one of the three eſtates of parliament, and compoſed of the Lords Spiritual and Temporal.

1. The *Spiritual Lords* conſiſt of two archbiſhops and 24 biſhops; and, at the diſſolution of monaſteries by Henry VIII. conſiſted likewiſe of 26 mitred abbots and two priors; a very conſiderable body, and in thoſe times equal in number to the temporal nobility. All theſe hold, or are ſuppoſed to hold, certain ancient baronies under the king: for William the Conqueror thought proper to change the ſpiritual tenor of frankalmoign or free alms, under which the biſhops held their lands during the Saxon government, into the feodal or Norman tenure by barony; which ſubjected their eſtates to all civil charges and aſſeſſments, from which they were before exempt; and in right of ſucceſſion to thoſe baronies, which were unalienable from their reſpective dignities, the biſhops and abbots were allowed their ſeats in the houſe of lords. But though theſe lords ſpiritual are in the eye of the law a diſtinct eſtate from the lords temporal, and are ſo diſtinguiſhed in moſt of our acts of parliament; yet in practice they are uſually blended together under the name of *the lords*: they intermix in their votes, and the majority of ſuch intermixture joins both eſtates. And from this want of a ſeparate aſſembly, and ſeparate negative of the prelates, ſome writers have argued very cogently, that the lords ſpiritual and temporal are now in reality only one eſtate: which is unqueſtionably true in every effectual ſenſe, though the ancient diſtinction between them ſtill nominally continues. For if a bill ſhould paſs their houſe, there is no doubt of its validity, though every lord ſpiritual ſhould vote againſt it; of which Selden and Sir Edward Coke give many inſtances: as, on the other hand, doubtleſs it would be equally good, if the lords temporal preſent were inferior to the biſhops in number, and every one of thoſe temporal lords gave his vote to reject the bill; though this Sir Edward Coke ſeems to doubt of.

2. The *Temporal Lords* conſiſt of all the peers of the realm (the biſhops not being in ſtrictneſs held to be ſuch, but merely lords of parliament), by whatever title of nobility diſtinguiſhed; dukes, marquiſes, earls, viſcounts or barons *. Some of theſe ſit by deſcent, as do all ancient peers; ſome by creation, as do all new

* See *Nobility*.

new made ones; others, ſince the union with Scotland, by election, which is the caſe of the 16 peers who repreſent the body of the Scots nobility. Their number is indefinite, and may be increaſed at will by the power of the crown: and once, in the reign of Queen Anne, there was an inſtance of creating no leſs than 12 together; in contemplation of which, in the reign of King George I. a bill paſſed the houſe of lords, and was countenanced by the then miniſtry, for limiting the number of the peerage. This was thought by ſome to promiſe a great acquiſition to the conſtitution, by reſtraining the prerogative from gaining the aſcendant in that auguſt aſſembly, by pouring in at pleaſure an unlimited number of new-created lords. But the bill was ill reliſhed, and miſcarried in the houſe of commons, whoſe leading members were then deſirous to keep the avenues to the other houſe as open and eaſy as poſſible.

The diſtinction of ranks and honours is neceſſary in every well governed ſtate: in order to reward ſuch as are eminent for their ſervices to the public, in a manner the moſt deſirable to individuals, and yet without burden to the community; exciting thereby an ambitious yet laudable ardour and generous emulation in others. And emulation, or virtuous ambition, is a ſpring of action which, however dangerous or invidious in a mere republic or under a deſpotic ſway, will certainly be attended with good effects under a free monarchy; where, without deſtroying its exiſtence, its exceſſes may be continually reſtrained by that ſuperior power from which all honour is derived. Such a ſpirit, when nationally diffuſed, gives life and vigour to the community; it ſets all the wheels of government in motion, which, under a wiſe regulator, may be directed to any beneficial purpoſe; and thereby every individual may be made ſubſervient to the public good, while he principally means to promote his own particular views. A body of nobility is alſo more particularly neceſſary in our mixed and compounded conſtitution, in order to ſupport the rights of both the crown and the people, by forming a barrier to withſtand the encroachments of both. It creates and preſerves that gradual ſcale of dignity which proceeds from the peaſant to the prince; riſing, like a pyramid from a broad foundation, and diminiſhing to a point as it riſes. It is this aſcending and contracting proportion that adds ſtability to any government; for when the departure is ſudden from one extreme to another, we may pronounce that ſtate to be precarious. The nobility therefore are the pillars, which are reared from among the people, more immediately to ſupport the throne; and, if that falls, they muſt alſo be buried under its ruins. Accordingly, when in the laſt century the commons had determined to extirpate monarchy, they alſo voted the houſe of lords to be uſeleſs and dangerous. And ſince titles of nobility are thus expedient in the ſtate, it is alſo expedient that their owners ſhould form an independent and ſeparate branch of the legiſlature. If they were confounded with the maſs of the people, and like them had only a vote in electing repreſentatives, their privileges would ſoon be borne down and overwhelmed by the popular torrent, which would effectually level all diſtinctions. It is therefore highly neceſſary, that the body of nobles ſhould have a diſtinct aſſembly, diſtinct deliberations, and diſtinct powers from the commons. See alſo King, Nobility, Parliament, Commons, and Commonalty.

As to the peculiar laws and cuſtoms relating to the houſe of lords: One very ancient privilege is that declared by the charter of the foreſt, confirmed in parliament 9 Hen. III.; viz. that every lord ſpiritual or temporal ſummoned to parliament, and paſſing through the king's foreſts, may, both in going and returning, kill one or two of the king's deer without warrant; in view of the foreſter if he be preſent, or on blowing a horn if he be abſent; that he may not ſeem to take the king's veniſon by ſtealth.

In the next place, they have a right to be attended, and conſtantly are, by the judges of the court of king's bench and common pleas, and ſuch of the barons of the exchequer as are of the degree of the coif, or have been made ſerjeants at law; as likewiſe by the king's learned counſel, being ſerjeants, and by the maſters of the court of chancery; for their advice in point of law, and for the greater dignity of their proceedings. The ſecretaries of ſtate, with the attorney and ſolicitor general, were alſo uſed to attend the houſe of peers, and have to this day (together with the judges, &c.) their regular writs of ſummons iſſued out at the beginning of every parliament, *ad tractandum et conſilium impendendum*, though not *ad conſentiendum*, but, whenever of late years they have been members of the houſe of commons, their attendance here hath fallen into diſuſe.

Another privilege is, that every peer, by licenſe obtained from the king, may make another lord of parliament his proxy, to vote for him in his abſence: A privilege, which a member of the other houſe can by no means have, as he is himſelf but a proxy for a multitude of other people.

Each peer has alſo a right, by leave of the houſe, when a vote paſſes contrary to his ſentiments, to enter his diſſent on the journals of the houſe, with the reaſons for ſuch diſſent; which is uſually ſtyled his proteſt.

All bills likewiſe, that may in their conſequences any way affect the rights of the peerage, are by the cuſtom of parliament to have their firſt riſe and beginning in the houſe of peers, and to ſuffer no changes or amendments in the houſe of commons.

There is alſo one ſtatute peculiarly relative to the houſe of lords; 6 Ann. c. 23. which regulates the election of the 16 repreſentative peers of North Britain, in conſequence of the 22d and 23d articles of the Union: and for that purpoſe preſcribes the oaths, &c. to be taken by the electors; directs the mode of balloting; prohibits the peers electing from being attended in an unuſual manner; and expreſly provides, that no other matter ſhall be treated of in that aſſembly, ſave only the election, on pain of incurring a præmunire. See alſo the articles Nobility and Peers.

LORDOSIS, (of λορδος, *bent inwards*), in the medical writings, a name given to a diſtempered ſtate of the ſpine, in which it is bent inwards, or towards the anterior parts. It is uſed in oppoſition to *gibbous*, or *hump-backed*. See Surgery.

LORETTO, a town of Italy, in the Marca or Marche of Ancona, with a biſhop's ſee. It is ſmall but fortified; and contains the famous *caſa ſanta*, or holy chapel, ſo much viſited by pilgrims. This chapel, according to the legend, was originally a ſmall houſe in Nazareth, inhabited by the virgin Mary, in which ſhe was ſaluted by the angel, and where ſhe bred our Saviour. After their deaths, it was held in great veneration by all believers in Jeſus, and at length conſecrated into a chapel, and dedicated to the Virgin; upon which occaſion St Luke made that identical image, which is ſtill preſerved here, and dignified with the name of our Lady of Loretto. This ſanctified edifice was allowed to ſojourn in Galilee as long as that diſtrict was inhabited by Chriſtians; but when infidels got poſſeſſion of the country, a band of angels, to ſave it from pollution, took it in their arms, and conveyed it from Nazareth to a caſtle in Dalmatia. This fact might have been called in queſtion by incredulous people, had it been performed in a ſecret manner; but, that it might be manifeſt to the moſt ſhort-ſighted ſpectator, and evident to all who were not perfectly deaf as well as blind, a blaze of celeſtial light, and a concert of divine muſic, accompanied it during the whole journey; beſides, when the angels, to reſt themſelves, ſet it down in a little wood near the road, all the trees of the foreſt bowed their heads to the ground, and continued in that reſpectful poſture as long as the ſacred chapel remained among them. But not having been entertained with ſuitable reſpect at the caſtle above mentioned, the ſame indefatigable angels carried it over the ſea, and placed it in a field belonging to a noble lady called *Lauretta*, from whom the chapel takes its name. This field happened unfortunately to be frequented at that time by highwaymen and murderers: a circumſtance with which the angels undoubtedly were not acquainted when they placed it there. After they were better informed they removed it to the top of a hill belonging to two brothers, where they imagined it would be perfectly ſecure from the dangers of robbery or aſſaſſination; but the two brothers, the proprietors of the ground, being equally enamoured of their new viſitor, became jealous of each other, quarrelled, fought, and fell by mutual wounds. After this fatal cataſtrophe, the angels in waiting finally moved the holy chapel to the eminence where it now ſtands, and has ſtood theſe 400 years, having loſt all reliſh for travelling.

The ſacred chapel ſtands due eaſt and weſt, at the farther end of a large church of the moſt durable ſtone of Iſtria, which has been built around it. This may be conſidered as the external covering, or as a kind of great coat to the *caſa ſanta*, which has a ſmaller coat of more precious materials and workmanſhip nearer its body. This internal covering or caſe is of the choiceſt marble, after a plan of San Savino's, and ornamented with baſſo relievos, the workmanſhip of the beſt ſculptors which Italy could furniſh in the reign of Leo X. The ſubject of theſe baſſo relievos are the hiſtory of the Bleſſed Virgin, and other parts of the Bible. The whole caſe is about 50 feet long, 30 in breadth, and the ſame in height: but the real houſe itſelf is no more than 32 feet in length, 14 in breadth, and at the ſides about 18 feet in height; the centre of the roof is four or five feet higher. The walls of this little holy chapel are compoſed of pieces of a reddiſh ſubſtance, of an oblong ſquare ſhape, laid one upon another, in the manner of brick. At firſt ſight, on a ſuperficial view, theſe red-coloured oblong ſubſtances appear to be nothing elſe than common Italian bricks; and, which is ſtill more extraordinary, on a ſecond and third view, with all poſſible attention, they ſtill have the ſame appearance. Travellers, however, are aſſured with great earneſtneſs, that there is not a ſingle particle of brick in their whole compoſition, being entirely of a ſtone, which, though it cannot now be found in Paleſtine, was formerly very common, particularly in the neighbourhood of Nazareth.

The holy houſe is divided within into two unequal portions, by a kind of grate-work of ſilver. The diviſion towards the weſt is about three fourths of the whole; that to the eaſt is called the *Sanctuary*. In the larger diviſion, which may be conſidered as the main body of the houſe, the walls are left bare, to ſhow the true original fabric of Nazareth ſtone; for they muſt not be ſuppoſed to be bricks. At the lower or weſtern wall there is a window, the ſame through which the angel Gabriel entered at the Annunciation. The architraves of this window are covered with ſilver. There are a great number of golden and ſilver lamps in this chapel: one of the former, a preſent from the republic of Venice, is ſaid to weigh 37 pounds, and ſome of the ſilver lamps weigh from 120 to 130 pounds. At the upper end of the largeſt room is an altar, but ſo low, that from it you may ſee the famous image which ſtands over the chimney in the ſmall room or ſanctuary. Golden and ſilver angels, of conſiderable ſize, kneel around her, ſome offering hearts of gold, enriched with diamonds, and one an infant of pure gold. The wall of the ſanctuary is plated with ſilver, and adorned with crucifixes, precious ſtones, and votive gifts of various kinds. The figure of the Virgin herſelf by no means correſponds with the fine furniture of her houſe: She is a little woman, about four feet in height, with the features and complexion of a negro. Of all the ſculptors that ever exiſted, aſſuredly St Luke, by whom this figure is ſaid to have been made, is the leaſt of a flatterer; and nothing can be a ſtronger proof of the Bleſſed Virgin's contempt for external beauty than her being ſatisfied with this repreſentation of her. The figure of the infant Jeſus, by St Luke, is of a piece with that of the Virgin: he holds a large golden globe in one hand, and the other is extended in the act of bleſſing. Both figures have crowns on their heads, enriched with diamonds: theſe were preſents from Ann of Auſtria, queen of France. Both arms of the Virgin are encloſed within her robes, and no part but her face is to be ſeen; her dreſs is moſt magnificent, but in a wretched bad taſte: this is not ſurpriſing, for ſhe has no female attendant. She has particular clothes for the different feaſts held in honour of her, and, which is not quite ſo decent, is always dreſſed and undreſſed by the prieſts belonging to the chapel; her robes are ornamented with all kinds of precious ſtones down to the hem of her garment.

There is a ſmall place behind the ſanctuary, in which are ſhown the chimney, and ſome other furniture, which they pretend belonged to the Virgin when ſhe lived at Nazareth; particularly a little earthen porringer, out of which the infant uſed to eat. The pilgrims bring roſaries, little crucifixes, and agnus dei's, which the obliging prieſt ſhakes for half a minute in this diſh; after which it is believed they acquire the virtue of curing various diſeaſes, and prove an excellent preventive of all temptations of Satan. The gown which the image had on when the chapel arrived from Nazareth is of red camblet, and carefully kept in a glaſs ſhrine.

Above 100 maſſes are daily ſaid in this chapel, and in the church in which it ſtands. The jewels and riches to be ſeen at any one time in the holy chapel are of ſmall value in compariſon of thoſe in the treaſury, which is a large room adjoining to the veſtry of the great church. In the preſſes of this room are kept thoſe preſents which royal, noble, and rich bigots of all ranks, have, by oppreſſing their ſubjects and injuring their families, ſent to this place. To enumerate every particular would fill volumes. They conſiſt of various utenſils and other things in ſilver and gold; as lamps, candleſticks, goblets, crowns, and crucifixes; lambs, eagles, ſaints, apoſtles, angels, virgins, and infants: then there are cameos, pearls, gems, and precious ſtones, of all kinds and in great numbers. What is valued above all the other jewels is, the miraculous pearl, wherein they aſſert that Nature has given a faithful delineation of the Virgin ſitting on a cloud with the infant Jeſus in her arms. There was not room in the preſſes of the treaſury to hold all the ſilver pieces which had been preſented to the Virgin. Several other preſſes in the veſtry are completely full. It is ſaid that thoſe pieces are occaſionally melted down by his holineſs for the uſe of the ſtate: and alſo that the moſt precious of the jewels are picked out and ſold for the ſame purpoſe, falſe ſtones being ſubſtituted in their room.

Pilgrimages to Loretto are not ſo frequent with foreigners, or with Italians of fortune and diſtinction, as formerly; nineteen out of twenty of thoſe who make this journey now are poor people, who depend for their maintenance on the charity they receive on the road. To thoſe who are in ſuch a rank in life as precludes them from availing themſelves of the charitable inſtitutions for the maintenance of pilgrims, ſuch journeys are attended with expence and inconveniency; and fathers and huſbands, in moderate or confined circumſtances, are frequently brought to diſagreeable dilemmas, by the raſh vows of going to Loretto which their wives or daughters are apt to make on any ſuppoſed deliverance from danger. To refuſe, is conſidered by the whole neighbourhood as cruel, and even impious; and to grant, is often highly diſtreſſing, particularly to ſuch huſbands as, from affection or any other motives, do not chooſe that their wives ſhould be long out of their ſight. But the poor, who are maintained during their whole journey, and have nothing more than a bare maintenance to expect from their labour at home, to them a journey to Loretto is a party of pleaſure as well as devotion, and by much the moſt agreeable road they can take to heaven. The greateſt concourſe of pilgrims is at the ſeaſons of Eaſter and Whitſuntide. The rich travel in their carriages: A greater number come on horſeback or on mules; or, what is ſtill more common, on aſſes. Great numbers of females come in this manner, with a male friend walking by them as their guide and protector: but the greateſt number of both ſexes are on foot. The pilgrims on foot, as ſoon as they enter the ſuburbs, begin a hymn in honour of the Virgin, which they continue till they reach the church. The poorer ſort are received into an hoſpital, where they have bed and board for three days.

The only trade of Loretto conſiſts of roſaries, crucifixes, little madonas, agnus dei's, and medals, which are manufactured here, and ſold to pilgrims. There are great numbers of ſhops full of theſe commodities, ſome of them of a high price; but infinitely the greater part are adapted to the purſes of the buyers, and ſold for a mere trifle. The evident poverty of thoſe manufacturers and traders, and of the inhabitants of this town in general, is a ſufficient proof that the reputation of our Lady of Loretto is greatly on the decline.

In the great church which contains the holy chapel are confeſſionals, where the penitents from every country of Europe may be confeſſed in their own language, prieſts being always in waiting for that purpoſe: each of them has a long white rod in his hand, with which he touches the heads of thoſe to whom he thinks it proper to give abſolution. They place themſelves on their knees in groupes around the confeſſional chair; and when the holy father has touched their heads with the expiatory rod, they retire, freed from the burden of their ſins, and with renewed courage to begin a freſh account.

In the ſpacious area before this church there is an elegant marble fountain, ſupplied with water from an adjoining hill by an aqueduct. Few even of the moſt inconſiderable towns of Italy are without the uſeful ornament of a public fountain. The embelliſhments of ſculpture and architecture are employed with great propriety on ſuch works, which are continually in the people's view; the air is refreſhed and the eye delighted by the ſtreams of water they pour forth; a ſight peculiarly agreeable in a warm climate. In this area there is alſo a ſtatue of Sixtus V. in bronze. Over the portal of the church itſelf is a ſtatue of the Virgin; and above the middle gate is a Latin inſcription, importing that within is the houſe of the mother of God, in which the Word was made fleſh. The gates of the church are likewiſe of bronze, embelliſhed with baſſo relievos of admirable workmanſhip: the ſubjects taken partly from the Old and partly from the New Teſtament, and divided into different compartments. As the gates of this church are ſhut at noon, the pilgrims who arrive after that time can get no nearer the *ſanta caſa* than theſe gates, which are by this means ſometimes expoſed to the firſt violence of that holy ardour which was deſigned for the chapel itſelf. All the ſculpture upon the gates which is within reach of the mouths of thoſe zealots, is in ſome degree effaced by their kiſſes.

There are alſo ſeveral paintings to be ſeen here, ſome of which are highly eſteemed, particularly two in the treaſury. The ſubject of one of theſe is the Virgin's Nativity, by Annibal Caracci; and of the other, a Holy Family by Raphael. There are ſome others of conſiderable merit which ornament the altars of the great church. Theſe altars, or little chapels, of which this fabric contains a great number, are lined with marble and embelliſhed by ſculpture; but nothing within this church intereſts a traveller of ſenſibility ſo much as the iron grates before thoſe chapels, which were made of the fetters and chains of the Chriſtian ſlaves, who were freed from bondage by the glorious victory of Lepanto.

The palace where the governor reſides ſtands near the church, and the eccleſiaſtics who are employed in it lodge in the ſame palace, where they receive the dignities of high diſtinction. The environs of this town are very agreeable, and in fine weather the high mountains of Croatia may be ſeen from hence. It is ſeated on a mountain, in E. Long. 13. 50. N. Lat. 43. 21.

LORICA, was a cuiraſs, brigantine, or coat of mail, in uſe among the Roman ſoldiers. It was generally made of leather, and is ſuppoſed to be derived from *lorum*.—The loricæ were ſet with plates of metal in various forms; ſometimes in hooks or rings like a chain, ſometimes like feathers, and ſometimes like the ſcales of ſerpents or fiſhes, to which plates of gold were often added. There were other lighter cuiraſſes conſiſting only of many folds of linen cloth, or of flax [illegible] ſtrong enough to reſiſt weapons. Such ſoldiers as were rated under 1000 drachms, inſtead of the lorica now deſcribed, wore a *pectorale*.—The Roman lorica was made like a ſhirt, and defended the wearer both before and behind, but was ſo contrived that the back part could be occaſionally ſeparated from the front. Some of the loricæ were made of cords of hemp or flax, cloſe ſet together; whence they are called *thoraces*, *bilices*, *trilices*, &c. from the number of the cords fixed one upon another; but theſe were uſed rather in hunting than in the field of battle.

LORIS, in *Zoology*. See LEMUR, MAMMALIA *Index*.

LORIMERS, one of the companies of London, that make bits for bridles, ſpurs, and ſuch like ſmall iron ware. They are mentioned in ſtatute 1 Rich. II. c. 12.—The word ſeems derived from the Latin word *lorum*, "a thong."

LORME, PHILIBERT DE, one of the moſt celebrated architects in the 16th century, was born at Lyons. Queen Catherine de Medicis gave him the ſuperintendance of buildings; and he had the direction of thoſe of the Louvre, the Thuilleries, the caſtle of St Anet, St Germains, and other edifices erected by her orders. He alſo wrote ſeveral books on architecture. He died about the year 1577.

LORNE, a diviſion of Argyllſhire in Scotland, which gives the title of marquis to the duke of Argyll. It extends above 30 miles in length from north to ſouth, and about nine at its utmoſt breadth; bounded on the eaſt by Braidalbin; on the weſt by the iſlands; on the north, by Lochaber; and is divided from Knapdale on the ſouth by Loch Etive, on the banks of which ſtands the caſtle of Bergomarn, wherein the courts of juſtice were anciently held. This diſtrict, abounding with lakes, is the moſt pleaſant and fertile part of Argyllſhire, producing plenty of oats and barley. It once belonged to the ancient family of Macdougal, ſtill reſiding on the ſpot; but devolved to the lords of Argyll in conſequence of a marriage with the heireſs, at that time a branch of the Stuart family. The chief place of note in this diſtrict is the caſtle of Dunſtaffnage, a ſeat of the Scottiſh kings previous to the conqueſt of the Picts in 843 by Kenneth II. In this place was long preſerved the famous ſtone, the palladium of North Britain; brought, ſays legend, out of Spain, where it was firſt uſed as a ſeat of juſtice by Gathelus, coeval with Moſes. It continued here as the coronation chair till the reign of Kenneth II. who removed it to Scone, in order to ſecure his reign; for, according to the inſcription,

Lorne.

> *Ni fallat fatum, Scoti quocunque locatum,*
> *Invenient lapidem, regnare tenentur ibidem.*

Some of the ancient regalia were preſerved till the preſent century, when the keeper's ſervants, during his infirm years, embezzled them for the ſilver ornaments; and left only a battleaxe, nine feet long, of beautiful workmanſhip, and ornamented with ſilver.

The caſtle is ſquare; the inſide only 87 feet; partly ruinous, partly habitable. At three of the corners are round towers; one of them projects very little. The entrance is towards the ſea at preſent by a ſtaircaſe, in old times probably by a drawbridge, which fell from a little gateway. The maſonry appears very ancient; the tops battlemented. This pile is ſeated on a rock at the mouth of Loch Etive, whoſe waters expand within to a beautiful bay, where ſhips may ſafely ride in all weather. Of this building, the founder of which is unknown, nothing remains except the outer walls, which, though rooſleſs, are ſtill in good order; and within which ſome buildings have been erected, which ſerve as the reſidence of the laird. The duke of Argyll is hereditary keeper under the crown.—At a ſmall diſtance from the caſtle is a ruined chapel, once an elegant building; and at one end an encloſure, a family cemetery. Oppoſite to theſe is a high precipice, ending abrupt, and turning ſuddenly toward the ſouth-eaſt. A perſon concealed in the receſs of the rock, a little beyond the angle, ſurpriſes friends ſtationed at ſome diſtance beneath the precipice with a very remarkable echo of any word, or even ſentence, he pronounces; which reaches the laſt diſtinct and unbroken. The repetition is ſingle, but remarkably clear.

In 1307, this caſtle was poſſeſſed by Alexander Macdougal lord of Argyll, a friend to the Engliſh: but was that year reduced by Robert Bruce, when Macdougal ſued for peace with that prince, and was received into favour.

We find, about the year 1455, this to have been a reſidence of the lords of the iſles; for here James laſt earl of Douglas, after his defeat in Annandale, fled to Donald, the Regulus of the time, and prevailed on him to take arms and carry on a plundering war againſt his monarch James II.

The ſituation of this regal ſeat was calculated for pleaſure as well as ſtrength. The views of mountains, valleys, waters, and iſlands, are delightful. On the north ſide of Loch Etive ſtood the town of Beregonium, ſuppoſed to have been the capital of the Weſt Highlands. It ſeems from certain mounds, excavations, and other appearances, to have been a ſtrong fortreſs, to prevent invaſion, or to ſecure a retreat, as occaſions might require. On the bank of the ſame loch is the ſite of Ardchattan, a priory of monks of Valliſcaullium in Burgundy, founded in 1230 by Donald Maccoul, anceſtor of the Macdougals of Lorne. Here Robert Bruce, who remained maſter of this country before he got entire poſſeſſion of Scotland, held a parliament or council.—The country abounds in Druidical, Danish, and other monuments.

LORRAIN, a sovereign ſtate of Europe, bounded on the north by Luxemburg and the archbiſhopric of Treves, on the eaſt by Alſace and the duchy of Deux Ponts, on the ſouth by Franche Comte, and on the weſt by Champagne and the duchy of Barr. It is about 100 miles in length, and 75 in breadth; and abounds in all ſorts of corn, wine, hemp, flax, rape-ſeed, game and fiſh, with which it carries on ſome trade, and in general all the neceſſaries of life. There are fine meadows and large foreſts, with mines of iron, ſilver, and copper, as alſo ſalt pits. There are a great number of rivers; of which the principal are the Maeſe or Meuſe, the Moſelle, the Scille, the Meure, and the Sarre. It is divided into three parts; the duchy of Lorrain, properly ſo called, which was heretofore a ſovereign ſtate; the duchy of Barr, which formerly belonged to the dukes of Lorrain, but afterwards came under the government of France; and the third comprehends the three biſhoprics of Metz, Toul, and Verdun, which have belonged to France ever ſince the year 1552. In 1733, the emperor of Germany being at war with France, this laſt got poſſeſſion of the duchy of Lorrain; and when there was a peace made in 1735, it was agreed, that Staniſlaus king of Poland, father-in-law to the king of France, ſhould poſſeſs theſe duchies, and that after his death they ſhould be united for ever to the crown of France. It was alſo then agreed, that Francis Stephen, duke of Lorrain, and the emperor's ſon-in-law, ſhould have the grand duchy of Tuſcany as an equivalent for Lorrain. After the death of the great duke of Tuſcany, in 1737, King Staniſlaus and the duke of Lorrain took poſſeſſion of their reſpective dominions, and the ceſſion was confirmed and guaranteed by a treaty in 1738. The trade conſiſts in corn and linen cloth. Nanci is the capital town.

Lorrain, *Robert le*, an eminent ſculptor, born at Paris in 1666. From his infancy, he made ſo rapid a progreſs in the art of deſigning, that at the age of 18 the celebrated Girardon intruſted him with the care of teaching his children and correcting his diſciples. He committed to him alſo, in conjunction with Nouliſſon, the execution of the famous tomb of Cardinal Richelieu in the Sorbonne, and his own tomb at St Landres in Paris. On his return from Rome, he finiſhed ſeveral pieces at Marſeilles, which had been left imperfect by the death of M. Puget. He was received into the academy of ſculpture in 1701. His *chef d'œuvre* is Galatea, a work univerſally admired. Lorrain afterwards made a Bacchus for the gardens at Verſailles, a Faun for thoſe of Marly; and ſeveral bronzes, among which is an Andromeda; all in an excellent taſte. This artiſt ſucceeded chiefly in heads; and more particularly in that of young girls, which he performed with incomparable delicacy and truth.

Lorrain, *Claude*. See Claude.

LOTEN, John, a good landſcape painter of the Engliſh ſchool; though a native of Switzerland. His taſte led him to ſolemn and dreary ſcenes, as land-ſtorms accompanied with ſhowers of rain, &c. and he ſeldom omitted to introduce oak trees in his proſpects: his landſcapes are generally large; and he painted with nature, truth, and force. But the effect of his compoſition had been much greater if he had been leſs cold in his colouring: for the judicious eye is not pleaſed with the darkiſh tint that predominates in it. He died in London about 1681.

LOTHIAN, a name given to three counties of Scotland, viz. Haddingtonſhire, Edinburghſhire, and Linlithgowſhire; otherwiſe called *Eaſt*, *Mid*, and *Weſt*, Lothians.

1. Eaſt Lothian, or Haddingtonſhire, is bounded on the north-weſt by the frith of Forth; and on the eaſt by the German ſea; on the ſouth-eaſt by Berwickſhire; and on the weſt by the county of Edinburgh. It extends about 25 miles from eaſt to weſt, and where broadeſt, nearly 15 from north to ſouth. The coaſt, advancing northward into the frith, forms an irregular curve. —This is one of the moſt fruitful counties in Scotland, producing great quantities of wheat and all ſorts of grain, well watered, and plentifully ſupplied with fiſh, fowl, fuel, and all the neceſſaries of life. It abounds with towns, villages, and farms, interſperſed with a great number of agreeable houſes belonging to perſons of rank and fortune. For cultivation, populouſneſs, and fertility, this ſhire may vie with any tract of land in the iſland of Great Britain. Beſide farming, which is ſucceſsfully carried on, the people towards the ſea-coaſt employ themſelves in the fiſhery, ſalt making, and in foreign trade; and ſome of the more inland inhabitants engage in the linen and woollen manufactures. Limeſtone and coal are found in moſt parts of the county, and great numbers of ſheep are fed on the hills of Lammermuir.

2. Edinburghſhire, or Mid Lothian, is about 35 miles long, but varies in its breadth in different places from five to 16 miles. It is bounded on the eaſt by Haddingtonſhire; on the weſt by the ſhire of Linlithgow; on the ſouth, by Tweeddale or Peebleſshire: and on the north, by part of Weſt Lothian and the frith of Forth. The aſpect of the country is in general level and pleaſant, interſperſed with a few hills, that help to exhibit agreeable proſpects. It is well watered with rivers, and ſhaded with woods. It produces plenty of coal, limeſtone, a ſoft black marble, and ſome copper ore. The ſoil, of itſelf fertile, is finely cultivated, and yields as plentiful harveſts of excellent wheat as are found in any part of Great Britain. The whole ſhire is interſperſed with noble houſes and plantations belonging to noblemen and gentlemen of fortune. The farmers, in general, are ſkilful and wealthy. The country is well inhabited, and preſents us with a good number of towns and populous villages. Along the ſea coaſt the common people ſubſiſt by fiſhing, and traffic in coals and ſalt, and ſome few carry on a ſmuggling commerce. Thoſe in the inland are employed in farming, and ſome branches of the weaving manufacture. Edinburgh is a county within itſelf.

3. The ſhire of Linlithgow, or Weſt Lothian, is bounded on the north by the frith of Forth. The ſmall river Almond divides it from Edinburghſhire on the eaſt. On the ſouth-weſt it joins the county of Lanark; and on the weſt, it is parted from Stirlingſhire by Avon, a ſmall river. Its form, though irregular, approaches to a parallelogram. It meaſures from north-eaſt to ſouth-weſt, nearly 20 miles. Its breadth, except on the ſhore of the frith, does not exceed 12.—The coun-

try is pleaſant and fertile, abounding with corn and paſturage. Here is found plenty of coal, limeſtone, and lead ore; nay, in the reign of James VI. it produced a rich mine of ſilver.

LOTION is, ſtrictly ſpeaking, ſuch waſhing as concerns beautifying the ſkin, by cleanſing it of thoſe deformities which a diſtempered blood throws upon it. Medicines of this kind, however, are for the moſt part inſignificant, and ſometimes very dangerous; the only proper method of treating theſe diſorders is, by adminiſtering ſuch medicines as tend to correct the morbid ſtate of the conſtitution from whence they ariſe.

LOTION, in *Pharmacy*, denotes a preparation of medicines, by waſhing them in ſome liquid, either made very light, ſo as to take away only the dregs; or ſharp, ſo as to penetrate them, in order to clear them of ſome ſalt, or corroſive ſpirit, as is done to antimony, precipitates, magiſteries, &c. or intended to take away ſome foulneſs or ill quality, or to communicate ſome good one.¶

LOTOPHAGI, in *Ancient Geography*, a people of the Regio Syrtica (ſo called from their living on the lotus); inhabiting between the two Syrtes from the Cinyphus to the Triton. The lotus was ſaid to be a food ſo luſcious, as to make ſtrangers forget their native country. A ſweet wine was expreſſed from it, which did not keep above ten days, (Pliny).

LOTOPHAGI of Homer. See MENINX.

LOTTERY, a kind of public game at hazard, frequent in Britain, France, and Holland, in order to raiſe money for the ſervice of the ſtate; being appointed with us by the authority of parliament, and managed by commiſſioners appointed by the lords of the treaſury for that purpoſe. It conſiſts of ſeveral numbers of blanks and prizes, which are drawn out of wheels, one of which contains the numbers, and the other the correſponding blanks or prizes.

The Romans invented lotteries to enliven their Saturnalia. This feſtival began by the diſtribution of tickets which gained ſome prize. Auguſtus made lotteries which conſiſted of things of little value; but Nero eſtabliſhed ſome for the people, in which 1000 tickets were diſtributed daily, and ſeveral of thoſe who were favoured by Fortune got rich by them. Heliogabalus invented ſome very ſingular: the prizes were either of great value or of none at all; one gained a prize of ſix ſlaves, and another of ſix flies; ſome got valuable vaſes, and others vaſes of common earth. A lottery of this kind exhibited an excellent picture of the inequality with which Fortune diſtributes her favours.

The firſt Engliſh lottery we find mentioned in hiſtory was drawn A. D. 1569. It conſiſted of 40,000 lots, at 10s. each lot: the prizes were plate; and the profits were to go towards repairing the havens of this kingdom. It was drawn at the weſt door of St Paul's cathedral. The drawing began on the 11th of January 1569, and continued inceſſantly, *day and night*, till the 6th of May following; as Maitland, from Stowe, informs us in his hiſtory, vol. i. p. 257. There were then only *three* lottery offices in London. The propoſals for this lottery were publiſhed in the years 1567 and 1568. It was at firſt intended to have been drawn at the houſe of Mr Dericke, her majeſty's ſervant, i. e. her jeweller, but was afterwards drawn as above mentioned.

Dr Rawlinſon ſhowed the Antiquarian Society, 1748, "A propoſal for a very rich lottery, general without any blankes, contayning a great number of good prizes, as well of redy money as of plate and certain ſorts of merchandizes, having been valued and priſed by the commandment of the queene's moſt excellent majeſtie's order, to the entent that ſuch commodities as may chance to ariſe thereof after the charges borne may be converted towards the reparations of the havens and ſtrength of the realme, and towards ſuch other public good workes. The number of lotts ſhall be foure hundred thouſand, and no more; and every lott ſhall be the ſum of tenne ſhillings ſterling, and no more. To be filled by the feaſt of St Bartholomew. The ſhew of priſes are to be ſeen in Cheapſide, at the ſign of the Queene's Armes, the houſe of Mr Dericke, goldſmith, ſervant to the queene. Some other orders about it in 1567-8. Printed by Hen. Bynneyman."

"In the year 1612, King James, in ſpecial favour for the preſent plantation of Engliſh colonies in Virginia, granted a lottery, to be held at the weſt end of St Paul's; whereof one Thomas Sharplys, a taylor of London, had the chief prize, which was 4000 crowns in fair plate." Baker's Chronicle.

In the reign of Queen Anne, it was thought neceſſary to ſuppreſs lotteries, as nuiſances to the public. Since that time, however, they have been licenſed by an act of parliament, under various regulations. The act paſſed in 1778 reſtrains any perſon from keeping an office for the ſale of tickets, ſhares, or chances, or for buying, ſelling, enſuring, or regiſtering, without a licenſe; for which licenſe each office-keeper muſt pay 50l. to continue in force for one year, and the produce to be applied towards defraying the expences of the lottery. And no perſon is allowed to ſell any ſhare or chance leſs than a ſixteenth, on the penalty of 50l. All tickets divided into ſhares or chances are to be depoſited in an office, to be eſtabliſhed in London by the commiſſioners of the treaſury, who are to appoint a perſon to conduct the buſineſs thereof; and all ſhares are to be ſtamped by the ſaid officer, who is to give a receipt for every ticket depoſited with him. The numbers of all tickets ſo depoſited are to be entered in a book, with the names of the owners, and the number of ſhares into which they are divided; and twopence for each ſhare is to be paid to the officer on depoſiting ſuch tickets, who is therewith to pay all expences incident to the office. All tickets depoſited in the office are to remain there three days after the drawing. And any perſon keeping an office, or ſelling ſhares, or who ſhall publiſh any ſcheme for receiving moneys in conſideration of any intereſt to be granted in any ticket in the ſaid lottery, &c. without being in poſſeſſion of ſuch ticket, ſhall forfeit 500l. and ſuffer three months impriſonment. And no buſineſs is to be tranſacted at any of the offices after eight in the evening, except on the evening of the Saturday preceding the drawing. No perſon is to keep any office for the ſale of tickets, &c. in Oxford or Cambridge, on penalty of 20l. Before this regulating ſtatute took place, there were upwards of 400 lottery offices in and about London only; but the whole number afterwards, for all Britain, as appeared by the liſt publiſhed by authority, amounted to no more than 51.

LOTUS, or BIRD'S-FOOT TREFOIL; a genus of plants belonging to the diadelphia claſs; and in the natural method ranking under the 32d order, *Papilionaceæ*. See BOTANY *Index*.

Lotus of Homer. See DIOSPYROS,
Egyptian Lotus. See NYMPHÆA,
Libyan Lotus. See RHAMNUS,
LOVAGE. See LIGUSTICUM,
} BOTANY *Index*.

LOVE, in a large ſenſe of the word, denotes all thoſe affections of the pleaſing kind which objects and incidents raiſe in us; thus we are ſaid to *love* not only intelligent agents of morally good diſpoſitions, but alſo ſenſual pleaſures, riches, and honours. But

LOVE, in its uſual and more appropriate ſignification, may be defined, "that affection which, being compounded of animal deſire, eſteem, and benevolence, becomes the bond of attachment and union between individuals of the different ſexes; and makes them feel in the ſociety of each other a ſpecies of happineſs which they experience no where elſe." We call it an *affection* rather than a *paſſion*, becauſe it involves a deſire of the happineſs of its object: And that its conſtituent parts are thoſe which have been juſt enumerated, we ſhall firſt endeavour to prove, and then proceed to trace its riſe and progreſs from a ſelfiſh appetite to a generous ſentiment.

Animal deſire is the actual energy of the ſenſual appetite: and that it is an eſſential part of the complex affection, which is properly called *love*, is apparent from this conſideration, that though a man may have ſentiments of eſteem and benevolence towards women who are both old and ugly, he never ſuppoſes himſelf to be in love of any woman, to whom he feels not the ſenſual appetite to have a ſtronger tendency than to other individuals of her ſex. On the other hand, that animal deſire *alone* cannot be called the affection of love is evident; becauſe he who gratifies ſuch a deſire without eſteeming its object, and wiſhing to communicate at the ſame time that he receives enjoyment, loves not the woman, but himſelf. Mere animal deſire has nothing in view but the ſpecies and the ſex of its object; and before it make a ſelection, it muſt be combined with ſentiments very different from itſelf. The firſt ſentiment with which it is combined, and by which a man is induced to prefer one woman to another, ſeems to be that by which we are delighted with gracefulneſs of perſon, regularity of features, and beauty of complexion. It is not indeed to be denied that there is ſomething irreſiſtible in female beauty. The moſt ſevere will not pretend that they do not feel an immediate prepoſſeſſion in favour of a handſome woman: but this prepoſſeſſion, even when combined with animal deſire, does not conſtitute the whole of that affection which is called *love*. Savages feel the influence of the ſenſual appetite, and it is extremely probable that they have ſome ideas of beauty; but among ſavages the affection of love is ſeldom felt. Even among the lower orders in civil ſociety it ſeems to be a very groſs paſſion, and to have in it more of the ſelfiſhneſs of appetite than of the generoſity of eſteem. To theſe obſervations many exceptions will no doubt be found (A): but we ſpeak of ſavages in general, and of the great body of the labouring poor, who in the choice of their mates do not ſtudy—who indeed are incapable of ſtudying, that rectitude of mind, and thoſe delicacies of ſentiment, without which neither man nor woman can deſerve to be eſteemed.

In the ſavage ſtate, and even in the firſt ſtages of refinement, the bond of union between the ſexes ſeems to conſiſt of nothing more than mere animal deſire and inſtinctive tenderneſs for their infant progeny. The former impels them to unite for the propagation of the ſpecies; and the latter preſerves the union, till the children, who are the fruit of it, be able to provide for their own ſubſiſtence. That in ſuch unions, whether caſual or permanent, there is no mutual eſteem and benevolence, is apparent from the ſtate of ſubjection in which women are held in rude and uncultivated nations, as well as from the manner in which marriages are in ſuch nations contracted.

Sweetneſs of temper, a capital article with us in the female character, diſplays itſelf externally in mild looks and gentle manners, and is the firſt and perhaps the moſt powerful inducement to love in a cultivated mind. "But ſuch graces (ſays an ingenious writer *) are ſcarce diſcernible in a female ſavage; and even in the moſt poliſhed woman would not be perceived by a male ſavage. Among ſavages, ſtrength and boldneſs are the only valuable qualities. In theſe, females are miſerably deficient; for which reaſon they are contemned by the males as beings of an inferior order. The North American tribes glory in idleneſs: the drudgery of labour degrades a *man* in their opinion, and is proper for *women* only. To join young perſons in marriage is accordingly the buſineſs of the parents; and it would be unpardonable *meanneſs* in the bridegroom to ſhow any *fondneſs* for the bride. In Guiana a woman never eats with her *huſband*, but after every meal attends him with water for waſhing; and in the Caribbee iſlands ſhe is not even permitted to eat in the *preſence* of her huſband. Dampier obſerves in general, that among all the wild nations with which he was acquainted, the women carry the burdens, while the men walk before and carry nothing but their arms; and that women even of the higheſt rank are not better treated. In Siberia, and even in Ruſſia, the capital excepted, men till very lately treated their wives in every reſpect like ſlaves. It might indeed be thought, that animal deſire, were there nothing elſe, ſhould have raiſed women to ſome degree of eſtimation among men; but male ſavages, utter ſtrangers to decency and refinement, gratify animal deſire with as little ceremony as they do hunger or thirſt.

* *Sketches of the Hiſtory of Man.*

"Hence it was that in the early ages of ſociety a man *purchaſed* a woman to be his wife, as one purchaſes an ox or a ſheep to be food; and valued her only as ſhe contributed to his ſenſual gratification. Inſtances innumerable might be collected from every nation of which we are acquainted with the early hiſtory: but we

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(A) Such as the negroes whoſe ſtory is ſo pathetically told by Addiſon in N° 215 of the Spectator; the two lovers who were killed by lightning at Staunton-Harcourt, Auguſt 9. 1718, (ſee *Pope's Letters*); and many others which will occur to every reader.

we ſhall content ourſelves with mentioning a few. Abraham bought Rebekah and gave her to his ſon Iſaac for a wife[*]. Jacob having nothing elſe to give, ſerved Laban 14 years for two wives[†]. To David, demanding Saul's daughter in marriage, it was ſaid, 'The king deſireth not any dowry, but an hundred foreſkins of the Philiſtines[‡].' In the Iliad Agamemnon offers his daughter to Achilles for a wife; and ſays that he would not demand for her any *price*[§]. By the laws of Ethelbert king of England, a man who committed adultery with his neighbour's wife was obliged to pay the huſband a fine, and to *buy him another wife*[||]." But it is needleſs to multiply inſtances; the practice has prevailed univerſally among nations emerging from the ſavage ſtate, or in the rudeſt ſtage of ſociety: and wherever it prevailed, men could not poſſibly have for the fair ſex any of that tender regard and eſteem which conſtitute ſo eſſential a part of the complex affection of love.

Accordingly we find the magnanimous Achilles an abſolute ſtranger to that generous affection, though his heart was ſuſceptible of the warmeſt and pureſt friendſhip. His attachment to Patroclus was ſo heroically diſintereſted, that he willingly ſacrificed his own life to revenge the death of his friend: but when Agamemnon threatened to rob him of his favourite female captive, though he felt the inſult offered to his *pride*, he never ſpoke of the *woman* but as a *ſlave* whom he was concerned to preſerve in point of *honour*, and as a teſtimony of his *glory*. Hence it is that we never hear him mention her but as his *ſpoil*, the *reward of war*, or the *gift* which the Grecians gave him.

" And dar'ſt thou threat to ſnatch my *prize* away,
" Due to the deeds of many a dreadful day?
" A *prize* as *ſmall*, O tyrant! match'd with thine,
" As thy own actions if compar'd with mine.
" Thine in each conqueſt is the *wealthy prey*,
" Tho' mine the ſweat and danger of the day.
" Some *trivial preſent* to my ſhips I bear,
" Or barren praiſes pay the wounds of war."

And again, after upbraiding the general with his tyranny and want of regard to merit, he adds, with the greateſt indifference as to the charms of the *woman*,

" Seize on Briſeïs, whom the Grecians doom'd
" My *prize of war*, yet tamely ſee *reſum'd*;
" And ſeize ſecure; no more Achilles draws
" His conquering ſword in any woman's cauſe.
" The gods command me to forgive the paſt;
" But let this firſt *invaſion* be the laſt:
" For know, thy blood, when *next* thou dar'ſt *invade*,
" Shall ſtream in vengeance on my reeking blade."

Pope has made the language of this rough warrior leſs inconſiſtent with the peculiar reſentment natural to an injured lover than it is in the original (B); but from the laſt quoted paſſage, even as tranſlated by him, it is apparent that Achilles would have been equally hurt had Agamemnon threatened to deprive him of any other part of his plunder. Accordingly he yields up Briſeis, not in grief for a miſtreſs whom he loſes, but in ſullenneſs for an injury that is done him. Nor let it be imagined, that this coldneſs proceeded from the pride of the hero, which would not permit him to acknowledge his love of a captive. With the generous affection of love captives and princeſſes were equally incapable of inſpiring him. He repeatedly affirmed indeed that he delighted in his fair Lyrneſſian ſlave, but it was only as an inſtrument of ſenſual gratification; for as to every thing elſe in a woman, he was ſo totally indifferent, that he declared he would not, when he ſhould be diſpoſed to marry, give himſelf the trouble to make a *choice*, but leave the whole matter to his father.

" If heav'n reſtore me to my realms with life,
" The rev'rend Peleus ſhall elect my wife."

Even Agamemnon, of whom Pope and Madame Dacier think more favourably as a lover, ſpeaks the very ſame language when mentioning his favourite captive Chryſeis. In his furious debate with Achilles he calls her indeed—

" A maid, unmatch'd in manners as in face,
" Skill'd in each art, and crown'd with ev'ry grace."

And adds,

" Not half ſo dear were Clytemneſtra's charms,
" When firſt her blooming beauties bleſt my arms."

But this was ſaid merely to enhance the value of the *prize*, which for the public good he was about to reſign; for that ſhe was dear to him only as miniſtering to his pleaſure, is paſt diſpute from the language which he had previouſly held with her father, as well as from his requiring grateful Greece to pay a juſt *equivalent*, and to repair his *private loſs*. A man who really loved would have thought nothing an *equivalent* for the object of his love; much leſs would he have inſinuated to her father

[*] Gen. xxiv.

[†] Gen. xxix.

[‡] 1 Sam. xviii. 25.

[§] Iliad ix.

[||] [illegible] Sect. 32.

(B) The original paſſages are:

Και δη μοι γερας αυτος αφαιρησεσθαι απειλεις,
Ὡ επι πολλ' εμογησα, δοσαν δε μοι υιες Αχαιων.
Ου μεν σοι ποτε ισον εχω γερας, οπποτ' Αχαιοι
Τρωων εκπερσωσ' ευναιομενον πτολιεθρον.
Αλλα το μεν πλειον πολυαικος πολεμοιο
Χειρες εμαι διεπουσ'· αταρ ην ποτε δασμος ικηται,
Σοι το γερας πολυ μειζον, εγω δ' ολιγον τε φιλον τε
Ερχομ' εχων επι νηας, επην κε καμω πολεμιζων.
Iliad, lib. i.

And, Αλλο δε τοι ερεω, συ δ' ενι φρεσι βαλλεο σησι·
Χερσι μεν ουτι εγωγε μαχησομαι, εινεκα κουρης,
Ουτε σοι, ουτε τω αλλω, επει μ' αφελεσθε γε δοντες.
Των δ' αλλων, α μοι εστι θοη παρα νηι μελαινη,
Των ουκ αν τι φεροις ανελων, αεκοντος εμειο·
Ει δ' αγε μην, πειρησαι, ινα γνωωσι και οιδε.
Αιψα τοι αιμα κελαινον ερωησει περι δουρι.

In this latter paſſage the hero ſays expreſsly, " I will not fight with you or with any other man for the ſake of a *girl*; but you ſhall not rob me of any other part of my *property*:" which is ſurely the language of a man to whoſe heart love muſt have been an utter ſtranger.

father a poſſibility of his diſmiſſing from his embrace a woman whom he eſteemed, when time ſhould have robbed her of every youthful grace.

Since, then, it is ſo apparent, that in the heroic age of Greece even princes and kings were ſtrangers to the generous affection of love, it needs not occaſion much ſurpriſe that the ſame affection has very little influence upon mankind in the loweſt ranks of the moſt poliſhed ſocieties of modern Europe. That this is actually the caſe, that among the generality of uneducated men and women there is no other bond of attachment than the ſenſual appetite, every year furniſhes multiplied proofs. We daily ſee youths, rejected by their miſtreſſes, paying their addreſſes without delay to girls who, in looks, temper, and diſpoſition, are diametrically oppoſite to thoſe whom ſo lately they pretended to love: We daily ſee maidens, ſlighted by their lovers, receiving the addreſſes of men, who, in nothing but their ſex, reſemble thoſe to whom a week before they wiſhed to be married: and we believe it is not very uncommon to find a girl entertaining ſeveral lovers together, that if one or more of them ſhould prove falſe, ſhe may ſtill have a chance not to be totally deſerted. Did eſteem and benevolence, placed on manners and character, conſtitute any part of vulgar love, theſe people would act very differently; for they would find it impoſſible to change their lovers and their miſtreſſes with the ſame eaſe that they change their clothes.

To this account of love, as it appears in ſavage nations, ſome one may perhaps oppoſe the paintings of the ſofter paſſion in the poems of Oſſian. That bard deſcribes the female character as commanding reſpect and eſteem, and the Caledonian heroes as cheriſhing for their miſtreſſes a flame ſo pure and elevated as never was ſurpaſſed, and has ſeldom been equalled, in thoſe ages which we commonly call moſt enlightened. This is indeed true: and it is one of the many reaſons which have induced Johnſon and others to pronounce the whole a modern fiction. Into that debate we do not enter. We may admit the authenticity of the poems, without acknowledging that they furniſh any exception to our general theory. They furniſh indeed in the manners which they deſcribe a wonderful anomaly in the general hiſtory of man. All other nations of which we read were in the hunter ſtate ſavage and cruel. The Caledonians, as exhibited by Oſſian, are gentle and magnanimous. The heroes of Homer fought for plunder, and felt no clemency for a vanquiſhed foe. The heroes of Oſſian fought for fame; and when their enemies were ſubdued, they took them to their boſoms. The firſt of Greeks committed a mean inſult on the dead body of the firſt of Trojans. Among the Caledonians inſults offered to the dead, as well as cruelty to the living, were condemned as infamous. The heroes of Oſſian appear in no inſtance as ſavages. How they came to be poliſhed and refined before they were acquainted with agriculture and the moſt uſeful arts of life, it is not our buſineſs to inquire; but ſince they unqueſtionably were ſo, their treatment of the female ſex, inſtead of oppoſing, confirms our theory; for we never conceived rich clothes, ſuperb houſes, highly-dreſſed food, or even the knowledge of foreign tongues, to be neceſſary to the acquiſition of a generous ſentiment. Luxury indeed appears to be as inimical to love as barbariſm: and we believe, that in modern nations, the tender and exalted affection which deſerves that name is as little known among the higheſt orders of life as among the loweſt. Perhaps the Caledonian ladies of Oſſian reſembled in their manners the German ladies of Tacitus, who accompanied their huſbands to the chaſe, fought by their ſides in battle, and partook with them of every danger. If ſo, they could not fail to be reſpected by a race of heroes among whom courage took place of all other virtues: and this ſingle circumſtance, from whatever cauſe it might proceed, will ſufficiently account for the eſtimation of the female character among the ancient Germans and Caledonians, ſo different from that in which it has been held in almoſt every other barbarous nation.

But if among ſavages and the vulgar, love be unknown, it cannot poſſibly be an inſtinctive affection: and therefore it may be aſked, How it gets poſſeſſion of the human heart; and by what means we can judge whether in any particular inſtance it be real or imaginary? Theſe queſtions are of importance, and deſerve to be fully anſwered; though many circumſtances conſpire to render it no eaſy taſk to give to them ſuch anſwers as ſhall be perfectly ſatisfactory. Love can ſubſiſt only between *individuals* of the different ſexes. A man can hardly *love two women* at the ſame time; and we believe that a woman is ſtill *leſs* capable of *loving at once more than one man*. Love, therefore, has a natural tendency to make men and women pair, or, in other words, it is the ſource of marriage: but in poliſhed ſociety, where alone this affection has any place, ſo many things beſides mutual attachment are neceſſary to make the married life comfortable, that we rarely ſee young perſons uniting from the impulſe of love, and have therefore but few opportunities of tracing the riſe, progreſs, and conſequences of the affection. We ſhall, however, throw together ſuch reflections as have occurred to us on the ſubject, not without indulging a hope, that they may be uſeful to the younger part of our readers when forming the moſt important connexion in life.

We have ſaid, that the perception of beauty, combined with animal deſire, is the firſt inducement which a man can have to prefer one woman to another. It may be added, that elegance of figure, a placid maſculine countenance, with a perſon which indicates ſtrength and agility, are the qualities which firſt tend to attach any woman to a particular man. Beauty has been defined *, "That particular form, which is the moſt common of all particular forms to be met with in the ſame ſpecies of beings." Let us apply this definition to our own ſpecies, and try, by means of it, to aſcertain what conſtitutes the beauty of the human face. It is evident, that of countenances we find a number almoſt infinite of different forms, of which forms one only conſtitutes beauty, whilſt the reſt, however numerous, conſtitute what is *not beauty*, but *deformity* or *uglineſs*. To an attentive obſerver, however, it is evident, that of the numerous particular forms of *uglineſs*, there is not one which includes ſo many faces as are formed after that particular caſt which conſtitutes *beauty*. Every particular ſpecies of the animal as well as of the vegetable creation, may be ſaid to have a fixed or determinate form, to which, as to a centre, nature is continually inclining. Or it may be compared to pendulums vibrating in different directions over one central point; and as they *all* croſs the *centre*, though only *one* paſſes through any *other point*; ſo it will be found that *perfect beauty* is oftener produced by nature than deformity: we do not mean than deformity in *general*, but than any *one kind* and *degree* of deformity. To inſtance in a particular part of a human feature: the line which forms the ridge of the noſe is deemed beautiful when it is *ſtraight;* but this is likewiſe the *central* form, which is oftener found than any one *particular degree* of *concave*, *convex*, or any *other* irregular form that ſhall be propoſed. As we are then more accuſtomed to beauty than deformity, we may conclude *that* to be the reaſon why we approve and admire it, juſt as we approve and admire faſhions of dreſs for no other reaſon than that we are uſed to them. The ſame thing may be ſaid of colour as of form: it is cuſtom alone which determines our preference of the colour of the *Europeans* to that of the *Ethiopians*, and which makes them prefer their own colour to ours; ſo that though habit and cuſtom cannot be the *cauſe* of beauty (ſee BEAUTY), they are certainly the cauſe of our liking it.

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* By *Pere* Buffier in his *Firſt Truths*, and Sir Joſhua Reynolds in the *Idler*.

That we *do like it* cannot be denied. Every one is conſcious of a pleaſing emotion when contemplating beauty either in man or woman; and when that pleaſure is combined with the gratification of the ſenſual appetite, it is obvious that the ſum of enjoyment muſt be greatly increaſed. The perception of beauty, therefore, neceſſarily directs the energy of the ſenſual appetite to a *particular* object; but ſtill this combination is a mere ſelfiſh feeling, which regards its object only as the *beſt* of many *ſimilar* inſtruments of pleaſure. Before it can deſerve the name of *love*, it muſt be combined with eſteem, which is never beſtowed but upon moral character and internal worth; for let a woman be ever ſo beautiful, and of courſe ever ſo deſirable as an inſtrument of ſenſual gratification, if ſhe be not poſſeſſed of the virtues and diſpoſitions which are peculiar to her ſex, ſhe will inſpire no man with a generous affection. With regard to the outlines, indeed, whether of internal diſpoſition or of external form, men and women are the ſame; but nature, intending them for mates, has given them diſpoſitions, which though concordant, are, however, different, ſo as to produce together delicious harmony. "The man, more robuſt, is fitted for ſevere labour, and for field exerciſes; the woman, more delicate, is fitted for ſedentary occupations, and particularly for nurſing children. The man, bold and vigorous, is qualified for being a protector *; the woman, delicate and timid, requires protection. Hence it is, that a man never admires a woman for poſſeſſing bodily ſtrength or perſonal courage; and women always deſpiſe men who are totally deſtitute of theſe qualities. The man, as a protector, is directed by nature to govern; the woman, conſcious of inferiority, is diſpoſed to obey. Their intellectual powers correſpond to the deſtination of nature. Men have penetration and ſolid judgement to fit them for governing; women have ſufficient underſtanding to make a decent figure under good government: a greater proportion would excite dangerous rivalſhip between the ſexes, which nature has avoided by giving them different talents. Women have more imagination and ſenſibility than men, which make all their enjoyments more exquiſite; at the ſame time that they are better qualified to communicate enjoyment. Add another capital difference of diſpoſition: the gentle and inſinuating manners of the female ſex tend to ſoften the roughneſs of the other ſex; and wherever women are indulged with any freedom, they poliſh ſooner than men.

"Theſe are not the only particulars that diſtinguiſh the ſexes. With reſpect to the ultimate end of love, it is the privilege of the male, as ſuperior and protector, to make a choice: the female, preferred, has no privilege but barely to conſent or to refuſe. Whether this diſtinction be the immediate reſult of the originally different diſpoſitions of the ſexes, or only the effect of aſſociations inevitably formed, may be queſtioned; but among all nations it is the practice for men to court, and for women to be courted: and were the moſt beautiful woman on earth to invert this practice, ſhe would forfeit the eſteem, however by her external grace ſhe might excite the deſire, of the man whom ſhe addreſſed. The great moral virtues which may be comprehended under the general term *integrity*, are all abſolutely neceſſary to make either men or women eſtimable; but to procure eſteem to the female character, the modeſty peculiar to their ſex is a very eſſential circumſtance. Nature hath provided them with it as a defence againſt the artful ſolicitations of the other ſex before marriage, and alſo as a ſupport of conjugal fidelity.

A woman, therefore, whoſe diſpoſitions are gentle, delicate, and rather timid than bold, who is poſſeſſed of a large ſhare of ſenſibility and modeſty, and whoſe manners are ſoft and inſinuating, muſt, upon moral principles (ſee MORAL PHILOSOPHY), command the eſteem and benevolence of every individual of the other ſex who is poſſeſſed of ſound underſtanding; but if her perſon be deformed, or not ſuch as to excite ſome degree of animal deſire, ſhe will attract no man's love. In like manner, a man whoſe moral character is good, whoſe underſtanding is acute, and whoſe converſation is inſtructive, muſt command the eſteem of every ſenſible and virtuous woman; but if his figure be diſagreeable, his manner unpoliſhed, his habits ſlovenly, and above all, if he be deficient in perſonal courage, he will hardly excite deſire in the female breaſt. It is only when the qualities which command eſteem are, in the ſame perſon, united with thoſe which excite deſire, that the individual ſo accompliſhed can be an object of love to one of the other ſex; but when theſe qualities are thus united, each of them increaſes the other in the imagination of the lover. The beauty of his miſtreſs gives her, in his apprehenſion, a greater ſhare of gentleneſs, modeſty, and every thing which adorns the female character, than perhaps ſhe really poſſeſſes; whilſt his perſuaſion of her internal worth makes him, on the other hand, apprehend her beauty to be abſolutely unrivalled.

To this theory an objection readily offers itſelf, which it is incumbent upon us to obviate. Men and women ſometimes fall in love at firſt ſight, and very often before they have opportunities of forming a juſt eſtimate of each other's moral character: How is this circumſtance to be reconciled with the progreſſive generation of love? We anſwer, By an aſſociation of ideas which is formed upon principles of phyſiogno-

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* Sketches of Man.

my. Every paſſion and habitual diſpoſition of mind gives a particular caſt to the countenance, and is apt to diſcover itſelf in ſome feature of the face. This we learn by experience; and in time, without any effort of our own, the idea of each particular caſt of countenance comes to be ſo cloſely aſſociated in our minds with the internal diſpoſition which it indicates, that the one can never afterwards be preſented to our view without inſtantly ſuggeſting the other to the imagination. (See METAPHYSICS and PHYSIOGNOMY). Hence it is that every man, who has been accuſtomed to make obſervations, naturally forms to himſelf, from the features and lineaments of a ſtranger's face, ſome opinion of his character and fortune. We are no ſooner preſented to a perſon for the firſt time, than we are immediately impreſſed with the idea of a proud, a reſerved, an affable, or a good-natured man; and upon our going into a company of abſolute ſtrangers, our benevolence or averſion, our awe or contempt, riſes inſtantly towards particular perſons, before we have heard them ſpeak a word, or know ſo much as their names or deſignations. The ſame thing happens when we are preſented to the fair ſex. If a woman, ſeen for the firſt time, have that particular caſt of countenance, and that expreſſion of features, to which we have aſſociated notions of *gentleneſs*, *modeſty*, and other female virtues, ſhe inſtantly commands our *eſteem*; and if ſhe have likewiſe ſo much *beauty* as to make her an object of particular *deſire*, eſteem and deſire become ſuddenly combined; and that combination conſtitutes the affection of love. Such, too, is the nature of all mental aſſociations, that each part of which they are compoſed adds ſtrength and vividneſs to the other parts; ſo that, in the preſent inſtance, deſire makes us imagine virtues in the woman which her countenance perhaps does not indicate; and the virtues which are there actually viſible, make us apprehend her beauty as more perfect than it is.

The affection thus generated is more or leſs pure, and will be more or leſs permanent, according as the one or the other part of which it is compounded predominates. "Where deſire of poſſeſſion [*] prevails over our eſteem of the perſon and merits of the deſirable object, love loſes its benevolent character: the appetite for gratification becomes ungovernable, and tends violently to its end, regardleſs of the miſery that muſt follow. In that ſtate love is no longer a ſweet agreeable affection; it becomes a ſelfiſh, painful paſſion, which, like hunger and thirſt, produceth no happineſs but in the inſtant of fruition; and when fruition is over, diſguſt and averſion generally ſucceed to deſire. On the other hand, where eſteem, founded on a virtuous character and gentle manners, prevails over animal deſire, the lover would not for the world gratify his appetite at the expence of his miſtreſs's honour or peace of mind. He wiſhes, indeed, for enjoyment; and to him enjoyment is more exquiſite than to the mere ſenſual lover, becauſe it unites ſentiment with the gratification of ſenſe; at the ſame time that, ſo far from being ſucceeded by diſguſt or averſion, it increaſes his benevolence to the woman, whoſe character and manners he eſteems, and who has contributed ſo much to his pleaſure. Benevolence to an individual, having a general end, admits of acts without number, and is ſeldom fully accompliſhed. Hence mutual love, which is compoſed chiefly of eſteem and benevolence, muſt neceſſarily be of a ſhorter duration than its objects. Frequent enjoyment endears ſuch lovers to each other, and makes conſtancy a pleaſure; and when the days of ſenſual enjoyment are over, eſteem and benevolence will remain in the mind, making ſweet, even in old age, the ſociety of that pair, in whom are collected the affections of huſband, wife, lover, friend, the tendereſt affections of human nature."

From the whole of this inveſtigation, we think it appears, that the affection between the ſexes which deſerves the name of *love*, is inſeparably connected with virtue and delicacy; that a man of looſe morals cannot be a faithful or a generous lover; that in the breaſt of him who has ranged from woman to woman for the mere gratification of his ſenſual appetite, deſire muſt have effaced all eſteem for the female character; and that, therefore, the maxim too generally received, "that a reformed rake makes the beſt huſband," has very ſeldom a *chance* to be true. We think it may likewiſe be inferred, that thouſands fancy themſelves in love who know not what love is, or how it is generated in the human breaſt: and therefore we beg leave to adviſe ſuch of our readers as may imagine themſelves to be in that ſtate, to examine their own minds, with a view to diſcover, whether, if the objects of their love were old or ugly, they would ſtill eſteem them for the virtues of their character, and the propriety of their manners. This is a queſtion which deſerves to be well weighed by the young and the amorous, who, in forming the matrimonial connexion, are too often blindly impelled by the mere animal deſire inflamed by beauty. "It may indeed happen [†], after the pleaſure of gratifying that deſire is gone (and if not refined by eſteem and benevolence, go it muſt with a ſwift pace), that a new bond of attachment may be formed upon more dignified and more laſting principles; but this is a dangerous experiment. Even ſuppoſing good ſenſe, good temper, and internal worth of every ſort, yet a new attachment upon ſuch qualifications is rarely formed; becauſe it *commonly* or rather *always*, happens, that ſuch qualifications, the only ſolid foundation of an indiſſoluble connexion, if they did not originally make eſteem predominate over animal deſire, are afterwards rendered altogether inviſible by ſatiety of enjoyment creating diſguſt."

LOVE, in *Medicine*. The ſymptoms produced by this paſſion as a diſeaſe, according to medical writers, are as follow: The eyelids often twinkle; the eyes are hollow, and yet appear as if full with pleaſure: the pulſe is not peculiar to the paſſion, but the ſame with that which attends ſolicitude and care. When the object of this affection is thought of, particularly if the idea is ſudden, the ſpirits are confuſed, the pulſe changes, and its force and time are very variable: in ſome inſtances, the perſon is ſad and watchful; in others, the perſon, not being conſcious of his ſtate, pines away, is ſlothful, and regardleſs of food; though the wiſer, when they find themſelves in love, ſeek pleaſant company and active entertainments. As the force of love prevails, ſighs grow deeper; a tremor affects the heart and pulſe; the countenance is alternately pale and red; the voice is ſuppreſſed in the fauces; the eyes grow dim; cold ſweats break out; ſleep abſents itſelf, at leaſt until the morning; the ſecretions became diſturbed ; and a loſs of appetite, a hectic fever, melancholy, or perhaps madneſs, if not death, conſtitutes the ſad cataſtrophe. On this ſubject the curious may conſult Ægineta, lib. iii. cap. 17. Oribat. Synop. lib. viii. cap. 9. or a treatiſe profeſſedly written on love, as it is a diſtemper, by James Ferrard, Oxford, printed 1640.

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[*] *Sketches of Man.*

[†] *Elements of Criticiſm.*

The manners of the Greeks and Romans were ſimilar to each other in the affairs of love. They generally made a diſcovery of their paſſion by writing upon trees, walls, doors, &c. the name of their beloved. They uſually decked the door of their dulcinea with flowers and garlands, made libations of wine before their houſes, ſprinkling the poſts with the ſame liquor, as if the object of their affection was a real goddeſs. For a man's garland to be untied, and for a woman to compoſe a garland, were held to be indubitable indications of their love.

When their love was without ſucceſs, they uſed ſeveral arts to excite affection in the object of their deſire. They had recourſe to enchantreſſes, of whom the Theſſalian were in the higheſt eſtimation. The means made uſe of were moſt commonly philtres or love potions, the operation of which was violent and dangerous, and frequently deprived ſuch as drank them of their reaſon. Some of the moſt remarkable ingredients of which they were compoſed were : the hippomanes, the jynx, inſects bred from putrefaction, the fiſh remora, the lizard, brains of a calf, the hairs on the tip of a wolf's tail, his ſecret parts, the bones of the left ſide of a toad eaten with ants, the blood of doves, bones of ſnakes, feathers of ſcreech-owls, twiſted cords of wool in which a perſon had hanged himſelf, rags, torches, reliques, a neſt of ſwallows buried and famiſhed in the earth, bones ſnatched from hungry bitches, the marrow of a boy famiſhed in the midſt of plenty, dried human liver ; to theſe may be added ſeveral herbs growing out of putrid ſubſtances. Such were the ingredients that entered into the compoſition of that infernal draught a *love potion*.

But, beſides the philtres, various other arts were uſed to excite love, in which the application of certain ſubſtances was to have a magical influence on the perſon againſt whom they levelled their ſkill. A hyæna's udder worn under the left arm, they fancied would draw the affections of whatever woman they fixed their eyes upon. That ſpecies of olives called πιτυρα, and barley-bran made up into a paſte, and thrown into the fire, they thought would excite the flame of love. Flour was uſed with the ſame intention. Burning laurel, and melted wax, were ſuppoſed to have the like effect. When one heart was to be hardened, and another mollified, clay and wax were expoſed to the ſame fire together. Images of wax were frequently uſed, repreſenting the perſons on whom they wiſhed to make an impreſſion ; and whatever was done to the ſubſtitute of wax, they imagined was felt by the perſon repreſented. Enchanted medicaments were often ſprinkled on ſome part of the houſe where the perſon reſided. Love-pledges were ſuppoſed to be of ſingular uſe and efficacy : theſe they placed under their threſhold, to preſerve the affections of the owner from wandering. Love-knots were of ſingular power, and the number three was particularly obſerved in all they did. But no good effect was expected, if the uſe of theſe things was not attended with charms or magical verſes and forms of words. See MAGIC.

Having mentioned their arts of exciting love, it may not be amiſs to take notice, that the ancients imagined, that love excited by magic may be allayed by more powerful ſpells and medicaments, or by applying to demons more powerful than thoſe who had been concerned in raiſing that paſſion. But love inſpired without magic had no cure ; Apollo himſelf could find no remedy, but cried out

> *Hei mihi quod nullis amor eſt medicabilis* herbis.

The antidotes againſt love were generally *agnus caſtus*, which has the power of weakening the generative faculty ; ſprinkling the duſt in which a mule had rolled herſelf ; tying toads in the hide of a beaſt newly ſlain ; applying amulets of minerals or herbs, which were ſuppoſed of great efficacy in other caſes ; and invoking the aſſiſtance of the inferior deities. Another cure for love was bathing in the waters of the river Selemnus ; to which we may add the lover's leap, or jumping down from the Leucadian promontory.

Love-Apple. See SOLANUM, BOTANY *Index*.

LOVENTINUM, or LUENTINUM, in *Ancient Geography*, a town of the Demeta in Britain, near the mouth of the Tuerobis or Tivy. Suppoſed to have been afterwards ſwallowed up by an earthquake, and to have ſtood where is now the lake called *Llin Savatan* in Brecknockſhire.

LOUGHBOROUGH, a town of Leiceſterſhire in England, 110 miles from London. It is the ſecond town in the county, and was in the Saxons time a royal village. Its market is on Thurſday ; and its fairs are on April 25th, May 28th, Auguſt 1ſt, and November 2d. It has a large church, and a free ſchool ; beſides a charity ſchool for 80 boys, and another for 20 girls. It has been very much reduced by fires ; but is ſtill a very agreeable town, with rich meadow-ground, on the foſſe, which runs here almoſt parallel with the river Soar. The new canal has made the coal trade here very extenſive.

LOUGHBRICKLAND, a town of Ireland, ſituated in the county of Down, and province of Ulſter, 58 miles from Dublin. The name ſignifies the lake of the *ſpeckled trout ;* and it was ſo called from a lake near it, which abounds with thoſe fiſh. It conſiſts of one broad ſtreet, at the end of which is the pariſh church, ſaid to have been built by Dr Taylor when biſhop of Dromore, ſoon after the Reſtoration. The linen manufacture is carried on here very extenſively ; and the town is a great thoroughfare, the turnpike road from Dublin to Belfaſt paſſing near it.

LOUGH-DERG, anciently *Derg-abhon*, i. e. "the river of the woody moraſs," from a river which iſſues out of this lake. This lough is ſituated in the county of Donegal and province of Ulſter in Ireland, and is famous for having in it the iſland that contains St Patrick's purgatory, which is a narrow little cell, hewn out of the ſolid rock, in which a man could ſcarce ſtand upright. There is alſo a lake of this name ſituated between the counties of Galway and Tipperary.

LOUGH-NEAGH, a loch or lake of Ireland, ſituated in the counties of Armagh, Down, Derry, and Antrim, and province of Ulſter. It is the largeſt in Europe, Lough-Neagh. Lough-Strangford.

Europe, thoſe of Ladoga and Onega in Ruſſia, and that of Geneva in Switzerland, excepted; being 20 miles long and 15 broad. The area of this lake is computed to be 100,000 acres. It is remarkable for a healing virtue; and likewiſe for petrifying wood, which is not only found in the water but in the adjacent ſoil at a conſiderable depth. On its ſhores ſeveral beautiful gems have been diſcovered. Its ancient name was *Loch Eacha*, or *Loch-Neach*, from *loch*, "a lake," and *Neach*, "wonderful, divine, or eminent." Its petrifying powers are not inſtantaneous, as ſeveral of the ancients have ſuppoſed, but require a long ſeries of ages to bring them to perfection, and appear to be occaſioned by a fine mud or ſand, which inſinuates itſelf into the pores of the wood, and which in proceſs of time becomes hard like ſtone. On the borders of this lake is Shane's caſtle, the elegant ſeat of Lord O'Neil. Dr Smyth ſeems to doubt whether the healing quality in this lake is not to be confined to one ſide of it, called the *fiſhing-bank*; and he informs us, that this virtue was diſcovered in the reign of Charles II. in the inſtance of the ſon of one Mr Cunningham, who had an *evil* which run on him in eight or ten places; and notwithſtanding all applications, ſeemed incurable: at length he was perfectly healed, after bathing in this lough about eight days. Hence that writer gives us another derivation of the name *Loch-Neach*, which (he ſays) ſeems to him to hint at this quality; *Neaſg* or *Neas*, in Iriſh, ſignifying a ſore or ulcer," which might not improbably be corrupted into *Neagh*: Hence he apprehends, this lake was remarked at a much earlier period for its healing property. As to its petrifying power, it is mentioned by Nenius, a writer of the 9th century, who ſays, "Eſt aliud ſtagnum quod facit ligna dureſcere in lapides. Homines autem findunt ligna, et poſtquam formaverunt, projiciunt in ſtagnum, et manent in eo uſque ad caput anni, et in capite anni lapis invenitur; et vocatur ſtagnum *Luch-Echach*." Lough-Neach gives title of baron to the family of *Skeffington*.

LOUGH-STRANGFORD, a lake of Ireland, ſituated in the county of Down and province of Ulſter. It takes its preſent name from a ſmall port-town called *Strangford*, ſeated on the weſt ſide of the narrow entrance into the ſea. It was formerly known by the name of *Lough-Cone* or *Lough-Coyne*. It is a deep bay or inlet of the ſea, about 17 miles long and four or five broad; it goes weſt as far as Downpatrick, and north as far as Comber and Newton, and by computation covers 25,775 acres, Iriſh plantation meaſure. It abounds with excellent fiſh, particularly ſmelts; and off the bar there is a periodical herring fiſhery in or about Auguſt. The bar or entrance into this lough is about three miles below Strangford. There is a long rock at the entrance in the middle of the paſſage, dangerous to ſtrangers on account of the current; yet there is a broad paſſage on either ſide, and deep water. The current here is very ſtrong and rapid, running at the rate of ſix or ſeven miles an hour. There are but few veſſels that go higher up than Strangford. A good many veſſels bound up the Channel put in here, if the wind is unfavourable to their paſſage. The iſlands in this lake are numerous; Doctor Boat enumerates them at 260. But from an actual ſurvey, made at the time Dr Smyth wrote his hiſtory of that county, it appears, there are 54 iſlands ſmall and great, known by particular names, and many others nameleſs: the contents of theſe 54 iſlands added together amount to 954 acres and a half. The great and profitable manufacture carried on in theſe iſlands, and the flat ſtony coaſts ſurrounding the lake, is the burning of ſea-weed into kelp, which employs a number of hands, and has been computed to produce to the ſeveral proprietors a neat profit of 1000l. per annum and upwards. Four of the iſlands here are called *Swan iſlands*, from the number of ſwans that frequent them.

Louis. Louiſiana.

LOUIS, or St Louis, *Knights of*, the name of a military order in France, inſtituted by Louis XIV. in 1693. Their colours were of a flame colour, and paſs from left to right; the king was their grand maſter. There were in it eight great croſſes, and 24 commanders; the number of knights was not limited. At the time of their inſtitution, the king charged his revenue with a fund of 900,000 livres for the penſions of the commanders and knights.

Louis, *Lewis*, *Louis d'or*, or *Lewidore*, a French coin, firſt ſtruck in 1640, under the reign of Louis XIII. and which has now a conſiderable currency. See Money-*Table*.

LOUISIANA, formerly a Spaniſh province of N. America, now belonging to the United States, is bounded on the eaſt by the Miſſiſſippi, on the ſouth by the gulf of Mexico, on the weſt by New Mexico, and on the north by boundaries which have not been defined. It is interſected by a number of fine rivers, and the greater part of the inhabitants are ſaid to be Roman Catholics. They are chiefly the deſcendants of the French and Canadians; but in different ſettlements of this extenſive country there are likewiſe to be met with the deſcendants of people from Germany, as well as numbers of Acadians and Americans. The population in 1785, when a cenſus was taken, amounted to more than 50,000 ſouls; but different authors are of opinion that this is much below the proper eſtimate, notwithſtanding the population bears no proportion to the extent of the country. According to another eſtimate there are 89,970. The inhabitants have often attempted to cultivate the ſugar cane, but they found the climate rather unfavourable to the culture of that plant. They chiefly export indigo, cotton, rice, beans, myrtle, wax, and lumber. But if the climate is unfriendly to the ſugar-cane, it is ſaid to be favourable to the health of the people, and to the culture of fruits and garden vegetables. The total value of the exports from Louiſiana in 1802 is ſaid to have amounted to 2,158,000 dollars, and of the imports to about 342,000 dollars above that ſum.

There are but few domeſtic manufactures of any importance in Louiſiana, but ſuch of the inhabitants as are denominated Acadians, manufacture ſome cotton into quilts and cottonades; and in the remote parts of the province, thoſe planters who are poor, are in the habit of ſpinning cloth mixed with wool for the uſe of the negroes. In the pariſh of Iberville there is a machine for ſpinning cotton, and another in the Opelouſas, but neither of them very extenſive; a conſiderable manufacture of cordage, twelve diſtilleries for making taffia, and a ſugar refinery which manufactures about 200,000 lbs. of loaf ſugar annually. The trade by ſea is conſiderable, for in the year 1802 there entered the river Miſſiſſippi 268 veſſels of all deſcriptions, one of which belonged to France, 97 to Spain, and 170 to America; and 265 ſailed from the Miſſiſſippi in the ſame year, three of which belonged to France, 104 to Spain, and 158 to America. The coaſting trade is alſo conſiderable from Penſacola, Mobille, and the creeks and rivers falling into Lake Pontchartrain, from whence ſhip timber, charcoal, lime, pitch and tar, are conveyed to New Orleans, in which about 500 ſloops and ſchooners from eight to 50 tons are frequently employed.

A return of the militia of Louiſiana was made by the baron of Carondelet to the court of Spain, which made them amount to 10,340 men; but in this eſtimate were included ſeveral companies of volunteers, negroes, and even companies of privileged horſe, or cavalry. There are not above 930 native Indians in this vaſt country, ſome of whom are employed by the ſettlers as boatmen on the Red river, and much eſteemed for their friendſhip to the whites, for their bravery and generoſity.

The fortifications which have been erected in Louiſiana ſcarcely merit our attention. Fort St Louis is commanded by a lieutenant-colonel, with a handful of troops; Baton Rouge is extremely ill conſtructed, and contains about 50 men; Fort Plaquemines, about 12 leagues from the ſea, is an irregular work built of bricks, and badly conſtructed, on the eaſt ſide of the river Miſſiſſippi, having a ditch in front of the river, and defended on the lower ſide by a deep creek. It is defenceleſs behind, as thoſe by whom it was erected had placed too much confidence in the ſwampineſs of the ground, which is every day growing harder. It would be no difficult matter to take it by eſcalade, for by the negligence of the people it is faſt falling into ruins. The ſmall redoubt called Fort Bourbon, is generally under the command of a ſerjeant, with a very ſmall company. Should a veſſel attempt to paſs without ſending a boat on ſhore, ſhe would be inſtantly fired upon.

When Louiſiana was firſt ceded to Spain, it preſerved many of the regulations peculiar to France; but the province afterwards came to be governed by the laws of Spain, and the ordinances formed expreſsly for the colony. The governor's court has a civil and military juriſdiction throughout the province. That of the lieutenant-governor has the ſame extent in civil caſes only. There are two alcades, whoſe juriſdiction, civil and criminal, extends through the city of New Orleans and five leagues around it, where the parties have no *fuero militar*, or military privilege; thoſe who have can transfer their cauſes to the governor. The tribunal of the alcade provincial has cognizance of criminal cauſes, where offences are committed in the country, or when the criminal takes refuge there, and in other ſpecified caſes. The eccleſiaſtical tribunal has juriſdiction in all matters reſpecting the church.

There are no colleges in Louiſiana, and but one public ſchool, which is at New Orleans, the maſters of which receive their ſalary from the king. They teach nothing but the Spaniſh language, and there are a few private ſchools for the benefit of children. It is remarkable that not more than one-half of the inhabitants are ſuppoſed qualified to read and write, and of theſe it is ſaid that not above 200 are capable of doing it well.

The clergy conſiſt of a biſhop, who does not reſide in the province, and whoſe ſalary of 4000 dollars is charged on the revenue of certain biſhoprics in Mexico and Cuba; two canons have each a ſalary of 600 dollars; and 25 curates, five for the city of New Orleans, and 20 for as many country pariſhes, who receive about 400 dollars each. Theſe ſalaries, excluſive of that of the biſhop, are paid by the treaſury at New Orleans, and their annual amount has been eſtimated at 13,000 dollars.

Inſtead of paying local taxes, each inhabitant is bound to make and repair roads, bridges, and embankments through his own land. A duty of ſix per cent. is payable at the cuſtomhouſe, on the transfer of ſhipping. It is aſcertained upon the ſum the buyer and ſeller declare to be the real conſideration. As no oath is required from either, they ſeldom report more than half the price. Two per cent. is payable on legacies and inheritances, coming from collaterals, and exceeding 2000 dollars; four per cent. on legacies given to perſons who are not relatives of the teſtator. A tax on civil employments, if their ſalaries exceed 300 dollars. A tax is levied of 40 dollars per annum for licenſes to ſell liquors, and ſix per cent. on all imports and exports, which amounts to about 120,000 dollars, while the amount of all the other taxes does not exceed 6000 dollars.

The expences of the government of Louiſiana are ſaid to amount to 650,000 dollars, to pay which there are 400,000 dollars ſent annually from Vera Cruz, in conſequence of which deficiency the debt is ſaid at preſent to amount to 450,000 dollars, bearing no intereſt, and depreciated 30 per cent.

Soon after Louiſiana was ceded to the United States, there were two ſocieties eſtabliſhed for the promotion of ſcience and literature, one of them at New Orleans, and another at Natchez. The former deſigns to publiſh a monthly magazine for the purpoſe of diffuſing a knowledge of the country, and to amuſe the readers of it with a variety of uſeful ſubjects. The latter, which was eſtabliſhed in 1803, called the Miſſiſſippi Society for the Acquirement and Diſſemination of uſeful Knowledge, conſiſts of near 40 members, and has correſpondents in various parts of the United States. The American government has granted it a charter of incorporation.

LOUSE. See PEDICULUS, ENTOMOLOGY *Index*.

LOUSY DISEASE. See MEDICINE *Index*.

LOUTH, a town of Lincolnſhire in England, 156 miles from London. It is a town corporate; and one of the handſomeſt and gayeſt in the county, there being in it not only frequent aſſemblies, concerts, &c. but even maſquerades. Here are ſeveral handſome houſes. From hence there is a canal to the ſea at Tilney, about eight miles. Beſides a charity ſchool for 40 children, it has a free ſchool founded by Edward VI. with a large church, and a fine ſteeple, which ſome think is as high as Grantham ſpire, which is 288 feet.

LOUTH, a county in the eaſtern part of Ireland, which extends in the form of a bow or half-moon, on the ſide of the ocean, being much longer than it is broad; it is bounded on the ſouth and ſouth-weſt by the county of Eaſt Meath, on the north-weſt by Monaghan, on the north by Armagh, and on the north-eaſt by the bay of Carlingford, which parts it from the county of Down: it is watered by ſeveral ſmall rivers which fall into the ſea; and its ſouth frontiers are watered by the river Boyne. Its chief towns are Dundalk and Carlingford; unleſs we include Drogheda, a part whereof is in this county. It is the ſmalleſt county in the kingdom; but very fertile and pleaſant, and abounding with many remains of antiquities, of which Mr Wright, in his Louthiana, has given a very ample deſcription. It contains 111,180 Iriſh plantation acres, 50 pariſhes, five baronies, and five boroughs; and formerly returned 10 members to parliament: it is about 22 miles long, and 14 broad.

Louth, a town in the above county, having a yearly fair.

LOUVAIN, a city in the Auſtrian Netherlands, in the province of Brabant, pleaſantly ſeated on the river Dyle, in a plentiful and agreeable country. The walls are about eight or nine miles in circumference; but they include ſeveral fields and vineyards. The caſtle ſtands on a high hill, ſurrounded with fine gardens, and has a charming proſpect all over the country. This town contains nine market places, 14 water-mills, 126 ſtreets, 16 ſtone bridges, and ſeveral handſome palaces. The townhouſe is a venerable old building, adorned with ſtatues on the outſide; and the churches are very handſome, particularly the collegiate church of St Peter; but the principal ornament is the univerſity, founded only in 1426 by John IV. duke of Brabant, with the concurrence of Pope Martin V. It contains about 40 colleges, four of which are called *Pedagogia*. There is in the number alſo an Engliſh college of friars-preachers, which owes its eſtabliſhment to the liberalities of Cardinal Philip Howard, brother to the duke of Norfolk, who, before he was raiſed to the purple, had been private chaplain to Queen Catherine, conſort to Charles II. The Iriſh have likewiſe a ſeminary, erected in part under the care of Eugenius Mattheus, titular archbiſhop of Dublin, anno 1623, which receives its appointments from the Propaganda at Rome. Beſides the above, there are two convents for the Iriſh, one of Recollects and the other of Dominicans, where divinity and the matheſis are taught. In the laſt century the number of ſcholars exceeded 4000; but in the year 1744 the inhabitants amounted to 12,000, including 2000 ſtudents only.—At the beginning of the 14th century, under John III. it flouriſhed conſiderably in the manufacture of woollen cloth: 400 houſes were then occupied by ſubſtantial clothiers, who gave employment to an incredible number of weavers, ſo great, it is ſaid, that a bell was rung to prevent any injuries which the children in the ſtreet might receive from the crowd and hurry on their returning from work. In 1382, theſe weavers, however, took up arms, and rebelled againſt their ſovereign Prince Wenceſlaus, throwing from the windows of the town hall 17 of the aldermen and counſellors, and afterwards proceeded to lay waſte great part of Brabant; but being beſieged and reduced to great extremities, they ſubmiſſively implored his clemency; which was granted after the execution of ſome of the principal ringleaders. The weavers, the chief inſtigators to this revolt, were baniſhed, the greater part of whom took refuge in England; where they firſt introduced, or at leaſt augmented very much, the woollen manufacture. The town, by this circumſtance, being almoſt depopulated, the univerſity was eſtabliſhed to ſupply in ſome meaſure the loſs of the rebellious clothiers. Since that time the manufacture gradually declined, no cloth of any account being made there at preſent. This impolitic ſtep of the duke Wenceſlaus ſent treaſures to England, through the hands of theſe exiled people: an important leſſon to governors, that they ſhould deal with great precaution reſpecting ſuch uſeful members of the community. Upon the ruins of theſe looms was founded the cloth manufacture at Limburg, which is carried on with good advantage to this day. There is yet ſtanding at Louvain part of the old drapers hall, now converted into four public ſchools, where lectures in divinity, philoſophy, law, and phyſic, are given, and the public acts are made. Adjoining to the ſchools is the univerſity library, which altogether compoſe a large pile of building. Over the door of the chief entrance we read theſe words, *Sapientia ædificavit ſibi domum.* The principal church is collegiate, dedicated to St Peter, which had formerly three very large towers with elevated ſpires, one conſiderably higher than the two collaterals; theſe were blown down in the year recorded by this chronogram, *oMnIa CaDVnt*. From the name of this church the burghers have acquired the nickname of *Petermen*, whoſe anceſtors having clothed the back by a noble woollen manufacture, the modern Petermen now compoſe an ignoble mixture for the belly, called after them *Peterman beer*, a ſort of whitiſh muddy ale, which they notwithſtanding ſend in large quantities to all parts of the country, as well as to Holland, by the canals. Louvain was anciently the capital of the province, long before Bruſſels had any claim to that title. It was taken by the French in 1792, afterwards loſt, and retaken in 1794. E. Long. 4. 40. N. Lat. 51. 12.

LOUYS, or Louis, *John*, an engraver of conſiderable eminence, who flouriſhed about the middle of the 16th century. According to Baſan he was a native of Flanders. He learned the art of engraving from Peter Soutman, at the time that Suyderhoef ſtudied under the ſame maſter; and his uſual ſtyle of engraving bears ſome reſemblance to that of his maſter's. One of his beſt prints is Diana, with her nymphs, repoſing after the chaſe; a middling-ſized plate, lengthwiſe, from Rubens.

LOW-BELL, in birding, a name given to a bell, by means of which they take birds in the night, in open champaign countries, and among ſtubble, in October. The method is to go out about nine o'clock at night in a ſtill evening, when the air is mild and the moon does not ſhine. The low-bell ſhould be of a deep and hollow ſound, and of ſuch a ſize that a man may conveniently carry it in one hand. The perſon who carries it is to make it toll all the way he goes, as nearly as may be, in that manner in which the bell on the neck of a ſheep tolls as it goes on and feeds. There muſt alſo be a box made like a large lanthorn, about a foot ſquare, and lined with tin, but with one ſide open. Two or three great lights are to be ſet in this; and the box is to be fixed to the perſon's breaſt, with the open ſide forwards, ſo that the light may be caſt forward to a great diſtance. It will ſpread as it goes out of the box; and will diſtinctly ſhow to the perſon that carries it whatever there is in the large ſpace of ground over which it extends, and conſequently all the birds that rooſt upon the ground. Two perſons muſt follow him who carries the box and bell, one on each ſide, ſo as not to be within the reach of the light to ſhow themſelves. Each of theſe is to have a hand-net of about three or four feet ſquare, faſtened to a long ſtick or pole; and on whichever ſide any bird is ſeen at rooſt, the perſon who is neareſt is to lay his net over it, and take it with as little noiſe as poſſible. When the net is over the bird, the perſon who laid it is not to be in a hurry to take the bird, but muſt ſtay till he who carries the light is got beyond it, that the motions may not be diſcovered. The blaze of the light and the noiſe of the bell terrify and amaze the birds in ſuch a manner that they remain ſtill to be taken; but the people who are about the work muſt keep the greateſt quiet and ſtillneſs that may be.

Some people are fond of going on this ſcheme alone. The perſon then fixes the light box to his breaſt, and carries the bell in one hand and the net in the other; the net in this caſe may be ſomewhat ſmaller, and the handle ſhorter. When more than one are out at a time, it is always proper to carry a gun; as it is no uncommon thing to ſpy a hare when on this expedition.

LOW, East, a town of Cornwall in England, 231 miles from London, in the poſt road from Plymouth. It is an ancient borough by preſcription, made a corporation by charter of Queen Elizabeth, conſiſting of nine burgeſſes (one of whom is yearly choſen mayor), a recorder, aldermen, &c.; and the mayor, magiſtrates, and freemen, who are about 68, chooſe the members of parliament. This being a manor of the duchy of Cornwall, was ſettled by King William on Lord Somers, and is now held by the corporation at the fee-farm rent of 20s. a-year. It is ſeated pretty commodiouſly on a creek of the ſea, over which there is a large ſtone bridge, ſupported by 15 arches, which leads to Weſt Low, ſtanding between two hills. The chief benefit which the inhabitants have is in their fiſhery. Here is a battery of four guns and a ſmall chapel.

Low, *Weſt*, called alſo *Port Pigham*, a town of Cornwall, divided from Eaſt Low by a ſtone bridge of 15 arches over the river Low, from whence both towns receive their name, as the river does from the lowneſs of its current between its high banks. The corporation, by charter of Queen Elizabeth, conſiſts of 12 burgeſſes, one of whom is annually choſen mayor, and, with the other burgeſſes, has power to chooſe a ſteward. Its members, whom it has ſent to parliament ever ſince the 6th of Edward VI. are elected by the corporation and freemen, who are about 60. There was a chapel of eaſe here in the reign of Henry VIII. which was afterwards converted into a town-hall; and the town lying in the pariſh of Talland, the people go thither to church. There is a pretty little harbour here; near the mouth of which is a ſmall iſland called *St George's*, which abounds with ſea pies. The river here is navigable for veſſels of 100 tons.

LOWER, Richard, an eminent Engliſh phyſician in the 17th century, was born in Cornwall, and educated at Weſtminſter ſchool and Oxford. He entered on the phyſic line; and practiſed under Dr Thomas Willis, whom he inſtructed in ſome parts of anatomy, eſpecially when the latter was writing his *Cerebri Anatome*. He, with Dr Willis, in 1674, diſcovered the medicinal waters at Aſhop in Northamptonſhire; which, upon their recommendation, became very much frequented. In 1666 he followed Dr Willis to London; practiſed phyſic under him; and became fellow of the Royal Society, and of the College of Phyſicians. In 1669 he publiſhed his *Tractatus de Corde*; and, after the death of Dr Willis in 1675, he was eſteemed the moſt eminent phyſician in London. Upon the breaking out of the Popiſh plot in 1678, ſays Mr Wood in his *Athenæ Oxonienſis*, he cloſed with the Whigs, ſuppoſing that party would carry all before them; but, being miſtaken, he loſt his credit and practice. He died in 1691.

LOWERING, among diſtillers, a term uſed to expreſs the debaſing the ſtrength of any ſpirituous liquor, by mixing water with it. The ſtandard and marketable price of theſe liquors is fixed in regard to a certain ſtrength in them called *proof*; this is that ſtrength which makes them, when ſhaken in a phial or poured from on high into a glaſs, retain a froth or crown of bubbles for ſome time. In this ſtate, ſpirits conſiſt of about half pure or totally inflammable ſpirit, and half water; and if any foreign or home ſpirits are to be expoſed to ſale, and are found to have that proof wanting, ſcarce any body will buy it till it has been diſtilled again and brought to that ſtrength; and if it is above that ſtrength, the proprietor uſually adds water to it to bring it down to that ſtandard. See the article Proof.

There is another kind of lowering among the retailers of ſpirituous liquors to the vulgar, by reducing it under the ſtandard proof. Whoever has the art of doing this without deſtroying the bubble proof, which is eaſily done by means of ſome addition that gives a greater tenacity to the parts of the ſpirits, will deceive all that judge by this proof alone. In this caſe, the beſt way to judge of liquors is by the eye and tongue, and eſpecially by the inſtrument called Hydrometer.

LOWTH, William, D. D. a learned divine, born at London in 1661, was the ſon of an apothecary, and took his degrees at Oxford. His eminent worth and learning recommended him to Dr Mew biſhop of Wincheſter, who made him his chaplain, gave him two livings in Hampſhire, and conferred on him a prebend in the cathedral of Wincheſter. He acquired an unuſual ſhare of critical learning. Thus ſituated in life, the labours of Mr Lowth appear to have been ſtrictly confined within the limits of his own province, and applied ſolely to the peculiar duties of his function: yet, in order that he might acquit himſelf the better in theology, he had purſued his ſtudies with a more general and extenſive view. Few were more deeply verſed in critical learning; there being ſcarcely any ancient author, Greek or Latin, profane or eccleſiaſtical, eſpecially the latter, but what he had read with accuracy, conſtantly accompanying his reading with critical and philological remarks. Of his collections in this way he was upon all occaſions very communicative. Hence his notes on *Clemens Alexandrinus*, which are to be met with in Potter's edition of that father. Hence his remarks on *Joſephus*, com-

Lowth.

communicated to Hudſon for his edition, and acknowledged in the preface; as alſo thoſe larger and more numerous annotations on the Eccleſiaſtical Hiſtorians, inſerted in *Reading*'s edition of them at Cambridge. The author of *Bibliotheca Biblica* was indebted to him for the ſame kind of aſſiſtance. Chandler, late biſhop of Durham, while engaged in his "Defence of Chriſtianity, from the Prophecies of the Old Teſtament, againſt the Diſcourſe of the Grounds and Reaſons of the Chriſtian Religion," and in his "Vindication of the Defence, in anſwer to The Scheme of Literal Prophecy conſidered," held a conſtant correſpondence with him, and conſulted him upon many difficulties that occurred in the courſe of that work. The moſt valuable part of his character was that which leaſt appeared in the eyes of the world, the private and retired part, that of the good Chriſtian and the uſeful pariſh prieſt. His piety, his diligence, his hoſpitality and beneficence, rendered his life highly exemplary, and greatly enforced his public exhortations. He married Margaret, daughter of Robert Pitt, Eſq. of Blandford, by whom he had two ſons and three daughters. (See the next article). He died in 1732, and was buried by his own orders in the churchyard at Buriton. He publiſhed, 1. A Vindication of the Divine Authority and Inſpiration of the Old and New Teſtaments; 2. Directions for the profitable reading of the Holy ſcriptures; 3. Commentaries on the Prophets; and other works.

Lowth, *Robert*, D. D. ſecond ſon of the preceding Dr William Lowth, and biſhop ſucceſſively of St David's, Oxford, and London, was born on the 29th of November 1710, probably at Buriton in the county of Hants. He received the rudiments of his education at Wincheſter college, where his ſchool exerciſes were diſtinguiſhed by uncommon elegance; and having reſided the requiſite number of years in that ſeminary, in 1730 he ſucceeded on the foundation at New College, Oxford. He took the degree of M. A. June 8. 1737. Though his abilities muſt have been known to thoſe with whom he was connected, he was not forward to appear before the world as a writer. At Oxford he continued many years improving his talents, with little notice from the great, and with preferment ſo ſmall as to have at preſent eſcaped the diſtinct recollection of ſome of his contemporaries.

He was not, however, ſuffered to languiſh for ever in obſcurity. His genius and his learning forced themſelves upon the notice of the illuſtrious ſociety of which he was a member; and he was placed in a ſtation where he was eminently qualified to ſhine. In 1741 he was elected by the univerſity to the profeſſorſhip of poetry, re-elected in 1743, and whilſt he held that office he read his admirable lectures *De ſacra poeſi Hebræorum*. In 1744 Biſhop Hoadley collated him to the rectory of Ovington in the county of Hants; added to it, nine years afterwards, the rectory of Eaſt Weedhay in the ſame county; and in the interim raiſed him to the dignity of archdeacon of Wincheſter. Theſe repeated favours he ſome years afterwards acknowledged in the following manly and reſpectful terms of gratitude: "This addreſs, My Lord, is not more neceſſary on account of the ſubject, than it is in reſpect of the author. Your Lordſhip, unſolicited and unaſked, called him from one of thoſe colleges to a ſtation of the firſt dignity in [illegible] and took the earlieſt opportunity of accumulating your favour upon him, and of adding to that dignity a ſuitable ſupport. Theſe obligations he is now the more ready thus publicly to acknowledge, as he is removed out of the reach of further favours of the like kind. And though he hath relinquiſhed the advantages ſo generouſly conferred on him, yet he ſhall always eſteem himſelf highly honoured in having once enjoyed the patronage of the great advocate of civil and religious liberty."

On the 8th of July 1754 the univerſity of Oxford conferred upon him the degree of D. D. by diploma; an honour which, as it is never granted but to diſtinguiſhed merit, was probably conferred on Mr Lowth in conſequence of his prelections on the Hebrew poetry, which had then been lately publiſhed. Having in 1749 travelled with Lord George and Lord Frederick Cavendiſh, he had a claim upon the patronage of the Devonſhire family; and in 1755, the late duke being then lord lieutenant of Ireland, Dr Lowth went to that kingdom as his grace's firſt chaplain. Soon after this appointment he was offered the biſhopric of Limerick; but preferring a leſs dignified ſtation in his own country, he exchanged it with Dr Leſlie, prebendary of Durham and rector of Sedgefield, for theſe preferments. In November 1765 he was choſen F. R. S. In June 1766 he was, on the death of Dr Squire, preferred to the biſhopric of St David's; which, in the October following, he reſigned for that of Oxford, vacant by the tranſlation of Biſhop Hume to Saliſbury. In April 1777, he was tranſlated to the ſee of London, vacant by the death of Biſhop Terrick; and in 1783 he declined the offer of the primacy of all England.

Having been long afflicted with the ſtone, and having long borne the ſevereſt ſufferings of pain and ſickneſs with the moſt exemplary fortitude and reſignation, this great and good man died at Fulham, Nov. 3. 1787; and on the 12th his remains were privately interred in a vault at Fulham church, near thoſe of his predeceſſor. He had married in 1752, Mary, the daughter of Laurence Jackſon of Chriſt-church, Hants, Eſq. by whom he had two ſons and five daughters. His lady and two children only ſurvived him.

His literary character may be eſtimated from the value and the importance of his works; in the account of which we may begin with his *Prelections on the Hebrew Poetry*. The choice of ſo intereſting a ſubject naturally attracted general attention; and the work has been read with equal applauſe abroad and at home. In theſe prelections the author has acquitted himſelf in the moſt maſterly manner, as a poet, a critic, and a divine; and ſuch is the claſſic purity of his Latin ſtyle, that though we have read the work with the cloſeſt attention, and with no other view than to diſcover, if poſſible, an Angliciſm in the compoſition, we never found a ſingle phraſe to which, we believe, a critic of the Auguſtan age could poſſibly have objected. This is an excellence to which neither Milton nor Johnſon has attained; to which indeed no other Engliſh writer of Latin with whom we are acquainted has attained, unleſs perhaps Atterbury muſt be excepted. To the prelections was ſubjoined a ſhort confutation of Biſhop Hare's ſyſtem of Hebrew metre; which occaſioned a Latin letter from Dr Edwards of

Lowth. Clare-hall, Cambridge, to Dr Lowth, in vindication of the Harian metre. To this the author of the prelections replied in a *larger confutation*, in which Biſhop Hare's ſyſtem is completely overthrown, and the fallacy upon which it was built accurately inveſtigated. After much attentive conſideration, Biſhop Lowth has pronounced the metre of the Hebrews to be perfectly irrecoverable.

In 1758 he publiſhed *The life of William of Wykeham, biſhop of Wincheſter*, with a dedication to Biſhop Hoadley; which involved him in a diſpute concerning a deciſion which that biſhop had lately made reſpecting the wardenſhip of Wincheſter college. This controverſy was on both ſides carried on with ſuch abilities, that, though relating to a private concern, it may yet be read, if not with pleaſure, at leaſt with improvement. The life of Wykeham is drawn from the moſt authentic ſources; and affords much information concerning the manners, and ſome of the public tranſactions, of the period in which Wykeham lived, whilſt it diſplays ſome private intelligence reſpecting the two literary ſocieties of which he was the founder. In theſe two ſocieties Dr Lowth was educated, and he gratefully expreſſes his obligations to them.

In 1762 was firſt publiſhed his *Short Introduction to Engliſh Grammar*, which has ſince gone through many editions. It was originally deſigned only for private and domeſtic uſe: but its judicious remarks being too valuable to be confined to a few, the book was given to the world; and the excellence of its method, which teaches what is right by ſhowing what is wrong, has inſured public approbation and very general uſe. In 1765 Dr Lowth was engaged with Biſhop Warburton in a controverſy, which made much noiſe at the time, which attracted the notice even of royalty, and of which the memory is ſtill recent. If we do not wiſh to dwell on the particulars of this controverſy, it is becauſe violent literary contention is an evil, which, though like other war it may ſometimes be unavoidable, is yet always to be regretted; and becauſe the characters of learned, ingenious, and amiable men, never appear to leſs advantage than under the form which that ſtate of hoſtility obliges them to aſſume. The two combatants indeed engaged with erudition and ingenuity ſuch as is ſeldom brought into conflict; but it appears that, in the opinion of Dr Johnſon, Warburton had the moſt ſcholaſtic learning, and that Lowth was the moſt correct ſcholar; that, in their conteſt with each other, neither of them had much argument, and that both were extremely abuſive. We have heard, and we hope it is true, that they were afterwards reconciled, and expreſſed mutual regret for the violence of their paſt conduct.

In 1778 Biſhop Lowth publiſhed his laſt great work, *A Tranſlation of Iſaiah.* To his literary and theological abilities, the tranſlator joined the moſt critical knowledge of the character and ſpirit of the eaſtern poetry; and, accordingly, the prophecies of Iſaiah (which, though almoſt always ſublime or elegant, are yet ſometimes obſcure) were tranſlated in a manner adequate to the higheſt expectations of the public. Several occaſional diſcourſes, which the biſhop, by his ſtation, was at different times called upon to deliver, were of courſe publiſhed, and are all worthy of their excellent author; but there is one on the *kingdom of God*, on the extenſion and progreſſive improvement of Chriſt's religion, and on the means of promoting theſe by the advancement of religious knowledge, by freedom of inquiry, by toleration, and mutual charity, which may be diſtinguiſhed above the reſt, as exhibiting a moſt comprehenſive view of the ſucceſſive ſtates of the Chriſtian church, and containing the trueſt principles of Chriſtianity.

Of the biſhop's poetical pieces, none diſplay greater merit than Verſes on the Genealogy of Chriſt, and the Choice of Hercules, both written very early in his life. He wrote a ſpirited Imitation of an Ode of Horace, applied to the alarming ſituation of this country in 1745; and likewiſe ſome Verſes on the death of Frederic prince of Wales, with a few ſmaller poems. The following inſcription on the tomb of his daughter, beautifully diſplays his paternal affection and claſſic taſte. As it is ſhort, and, in our opinion, has all the merit of the ancient epitaph, the reader will probably be pleaſed with ſuch a ſpecimen of his lordſhip's Latinity.

Cara, vale, ingenio præſtans, pietate, pudore,
Et pluſquam natæ nomine cara, vale.
Cara Maria, vale. At veniet felicius ævum,
Quando iterum tecum, ſim modo dignus, ero.
Cara, redi, læta tum dicam voce, paternos,
Eja, age in amplexus, cara Maria, redi.

Learning and taſte, however, did not conſtitute Biſhop Lowth's higheſt excellence. Eulogium itſelf can ſcarcely aſcend to extravagance when ſpeaking of him either as a private man or as a paſtor of the church of Chriſt. His amiable manners rendered him an ornament to his high ſtation, whilſt they endeared him to all with whom he converſed; and his zeal for the intereſts of true religion made him eager to promote to places of truſt and dignity ſuch clergymen as he knew were beſt qualified to fill them. Of his modeſty, gentleneſs, and pleaſing converſation, we have the teſtimony of one whoſe deciſion will hardly be diſputed.— "It would anſwer no end (ſays Biſhop Warburton) to tell you what I thought of the author of Hebrew poetry, before I ſaw him. But this I may ſay, I was never more ſurpriſed, when I did ſee him, than to find him of ſuch amiable and gentle manners, of ſo modeſt, ſenſible, and diſengaged a deportment." He united, indeed, in an eminent degree, the qualities of the gentleman with thoſe of the ſcholar: he converſed with elegance, as he wrote with accuracy. As a huſband, a father, or the maſter of a family, he was as nearly faultleſs as the imperfections of humanity will eaſily permit. His temper, when rouſed by what he thought improper conduct was indeed ſuſceptible of conſiderable warmth; but if he could be highly offended, upon a ſlight conceſſion he could likewiſe forgive. His heart was tender and ſympathetic. He poſſeſſed a mind which felt its own ſtrength, and decided on whatever came before it with promptitude and firmneſs. In thoſe trials where affliction was to be ſuffered or ſubdued, he behaved as a man and a Chriſtian. His piety had no tincture of moroſeneſs; his charity no leaven of oſtentation. To his whole dioceſe he was endeared by his laudable diſcretion and his uſeful zeal. To the world he was a benefit by his exemplary life and his ſplendid abilities. And whilſt virtue and learning are reverenced among men, the memory of Lowth will be reſpected and admired.

LOXIA, a genus of birds of the order of paſſeres. See ORNITHOLOGY *Index*.

LOYOLA, IGNATIUS. See IGNATIUS.

LOZENGE, in *Heraldry*, a four-cornered figure, reſembling a pane of glaſs in old caſements. See HERALDRY. Though all heralds agree, that ſingle ladies are to place their arms on lozenges, yet they differ with reſpect to the cauſes that gave riſe to it. Plutarch ſays, in the life of Theſeus, that in Megara, an ancient town of Greece, the tomb-ſtones, under which the bodies of the Amazons lay, were ſhaped after that form; which ſome conjecture to be the cauſe why ladies have their arms on lozenges. *S. Petra Sancta* will have this ſhield to repreſent a *cuſhion*, whereupon women uſed to ſit and ſpin, or do other houſewifery. Sir J. Ferne thinks it is formed from the ſhield called *teſſera*, which the Romans finding unfit for war, did allow to women to place their enſigns upon, with one of its angles always uppermoſt.

LOZENGES, among jewellers, are common to brilliant and roſe diamonds. In brilliants, they are formed by the meeting of the ſkill and ſtar facets on the bezil; in the latter, by the meeting of the facets in the horizontal ribs of the crown. See FACETS.

LOZENGE is alſo a form of medicine, made into ſmall pieces, to be held or chewed in the mouth till they are melted there: the ſame with what are otherwiſe called *trochiſci*, "troches."

LUBEC, a city and port-town of Germany, in the circle of Lower Saxony and duchy of Holſtein, in E. Long. 10. 35. N. Lat. 54. 20. It ſtands at the conflux of ſeveral rivers, the largeſt of which is the Trave, 12 miles from the Baltic, where it has a fine harbour, and 40 north-eaſt of Hamburgh. By the Steckenitz, another of thoſe rivers, it has a communication with the Elbe, and conſequently with the German ocean. The city lies on the ſide of a hill, with the Trave, increaſed by the Steckenitz on the one ſide, and the Wakenitz on the other; and is ſtrongly fortified with baſtions, moats, walls, and ramparts; the laſt of which are planted with trees, and form an agreeable walk. Lubec being formerly the chief of the Hanſe towns, was very powerful in conſequence of the vaſt trade it carried on; but a great part of that trade is now transferred to Hamburgh; however, it is ſtill ſaid to employ 150 of its own ſhips, and has a great ſhare of the Baltic trade. It is about two miles in length, and more than one in breadth. The houſes are all of ſtone, but old faſhioned. Several of the ſtreets have on each ſide rows of lime trees, with canals in the middle, like thoſe of Holland. The public ſtructures conſiſt of the ancient cathedral of the biſhopric of Lubec, and ſeveral other Lutheran churches; a nunnery for 22 ladies, with an abbeſs and prioreſs; a poor-houſe, an alms-houſe, and houſe of correction; an orphan-houſe, an hoſpital dedicated to the Holy Ghoſt; a houſe in which poor travellers are entertained three days, and then ſent forward with a paſs; but ſuch as happen to be ſick, are provided with all neceſſaries till they recover or die; the city armoury, a grammar ſchool of ſeven claſſes, the Calviniſt church, and the Popiſh chapel. The deputies of the Hanſe-towns uſed to meet here formerly in the townhouſe. An alliance ſtill ſubſiſts between Lubec, Hamburgh, and Bremen; and theſe cities, under the name of *Hanſe towns*, negotiate treaties with foreign powers. Here are divers manufactures, and the city's territory is about 60 miles in compaſs. In the diet of the empire Lubec is poſſeſſed of the third ſeat among the Rheniſh imperial cities; and among thoſe of the circle, has the firſt. In the matricula, its aſſeſſment is 480 florins, and to the chamber of Wetzlar it pays 557 rixdollars and 88 kruitzers. The city is a republic within itſelf, and both makes and executes laws in regard to civil and criminal matters, &c. A father and ſon, or two brothers, cannot be in the regency at the ſame time. The famous league of the Hanſe-towns was begun here in 1164. This city had its charter of privileges from the emperor Frederic II. Formerly it carried on wars, both offenſive and defenſive, for ſeveral years, not only againſt the dukes of Mecklenburg, but againſt the kings of Sweden and Denmark; particularly in 1428, when it fitted out 250 ſhips of force againſt Eric X. king of Denmark. There are about 20 churches in Lubec, with lofty ſteeples or ſpires. The Trave brings ſhips of burden into the very heart of the city; but the largeſt unload at Travemunde, i. e. the mouth of the Trave, eight or ten miles diſtant. Formerly it is ſaid to have employed no leſs than 600 ſhips. In the famous cellar here, it is ſaid, there is wine 200 years old. The church of St Mary's, a noble lofty pile, is ſupported by tall pillars, all of one ſtone each, and has a high ſpire, covered with gilt lead. The town's garriſon conſiſts of about 700 or 800 men. The revenue of its Lutheran biſhop, though he is a prince of the empire, is ſaid not to exceed 3000l. Lubec fell into the hands of the French in 1806, when Bonaparte overran the Pruſſian dominions; and many of the inhabitants were cruelly maſſacred and plundered.

LUBEN, a town of Germany, in the marquiſate of Lower Luſatia. It is ſituated on the river Spree, and is the capital of a ſmall circle of the ſame name. It is the ſeat of the diets, and of the chief tribunals and offices; and has ſeveral churches, with a noble land-houſe and hoſpital. E. Long. 14. 25. N. Lat. 52.

LUBIENIETSKI, STANISLAUS, a Poliſh gentleman, deſcended from a noble family, and born at Cracow in 1623, was educated by his father with great attention. He became a celebrated Socinian miniſter; and took great pains to obtain a toleration from the German princes for his Socinian brethren. His labours, however, were ineffectual; being himſelf perſecuted by the Lutheran miniſters, and baniſhed from place to place; until at length he was baniſhed out of the world, with his two daughters, by poiſon, his wife narrowly eſcaping, in 1675. We have of his writing A Hiſtory of the Reformation in Poland; A Treatiſe on Comets; with other works, in Latin.

LUBIN, EILHARD, was profeſſor of poetry in the univerſity of Roſtock in 1595; and ten years afterwards was promoted to the profeſſorſhip of divinity. He wrote notes on Anacreon, Juvenal, Perſius, &c. and ſeveral other works; but that which made the moſt noiſe is a treatiſe on the nature and origin of evil, entitled *Phoſphorus de Cauſa prima et Natura Mali*, printed at Roſtock in 1596; in which we have a curious hypotheſis to account for the origin of moral evil.

He ſuppoſed two co-eternal principles, not *matter* and *form*, as Plato did: but God, and *Nihil* or Nothing. This was publiſhed againſt by Grawer, was anſwered by Lubin: but after all he is deemed better acquainted with polite literature than with divinity. He died in 1621.

LUBLIN, a handſome and conſiderable town of Poland, capital of the palatinate of the ſame name, with a citadel, a biſhop's ſee, an univerſity, and a handſome Jewiſh ſynagogue. Here the judicial courts for all Poland are held. It has three fairs, frequented by merchants from all nations. It is ſeated on the river Byſtrzna. E. Long. 22. 31. N. Lat. 51. 26.

LUCA, in *Ancient Geography*, a town of Etruria, on the river Auſer; a colony and a municipium. Now *Lucca*, capital of the republic of that name, near the river Sechia. E. Long. 11. 20. N. Lat. 43. 45.

LUCANIA, a country of Italy, and a part of Magna Græcia; bounded on the north by the river Silarus, by which it was ſeparated from the Picentini, and by the river Bradanus by which it was parted from the Apuli Peucetii, on the ſouth by the Laüs, which ſeparated it from the Bruttii; on the eaſt by the ſinus Tarentinus; and on the weſt by the Tuſcan ſea. *Lucani*, the people, deſcendants of the Samnites. *Lucanus* the epithet, (Horace). *Lucæ boves* denoted elephants; firſt ſeen in Pyrrhus's wars in Lucania, whence the appellation (Pliny).

LUCANUS, Marcus Annæus, a Latin poet, born at Corduba in Spain, about A. C. 39. He was the ſon of Annæus Mela, the youngeſt brother of Seneca; and was conveyed to Rome from the place of his nativity at the age of eight months; a circumſtance, as his more indulgent critics obſerve, which ſufficiently refutes the cenſure of thoſe who conſider his language as provincial. At Rome he was educated under the Stoic Cornutus, ſo warmly celebrated by his diſciple Perſius the ſatiriſt, who was the intimate friend of our poet. In the cloſe of his education, Lucan is ſaid to have paſſed ſome time at Athens. On his return to Rome he roſe to the office of quæſtor, before he had attained the legal age. He was afterwards enrolled among the augurs; and married a lady of noble birth, and of a moſt amiable character. Lucan had for ſome time been admitted to familiarity with Nero, when the emperor choſe to contend for poetical honours by the public recital of a poem he had compoſed on Niobe; and ſome verſes of his imperial production are ſuppoſed to be preſerved in the firſt ſatire of Perſius. Lucan had the hardineſs to repeat a poem on Orpheus, in competition with that of Nero; and, what is more remarkable, the judges of the conteſt were juſt and bold enough to decide againſt the emperor. From hence Nero became the perſecutor of his ſucceſsful rival, and forbade him to produce any poetry in public. The well known conſpiracy of Piſo againſt the tyrant ſoon followed; and Tacitus, with his uſual ſarcaſtic ſeverity, concludes that Lucan engaged in the enterpriſe from the poetical injuries he had received: "a remark (ſays Mr Hayley*, who has endeavoured to refute the imputation) which does little credit to the candour of the hiſtorian; who might have found a much nobler, and, I will add, a more probable motive for his conduct in the generous ardour of his character, and his paſſionate adoration of freedom. In the ſequel of his narration, Tacitus alleges a charge againſt our poet, which, if it were true, muſt lead us to deteſt him as the moſt abject of mankind. The hiſtorian aſſerts, that Lucan, when accuſed of the conſpiracy, for ſome time denied the charge; but corrupted at laſt by a promiſe of impunity, and deſirous to atone for the tardineſs of his confeſſion, accuſed his mother Atilla as his accomplice. This circumſtance is ſo improbable in itſelf, and ſo little conſonant to the general character of Lucan, that ſome writers have treated it with contempt, as a calumny invented by Nero, to vilify the object of his envious abhorrence. But the name of Tacitus has given ſuch an air of authority to the ſtory, that it may ſeem to deſerve a more ſerious diſcuſſion, particularly as there are two ſubſequent events related by the ſame hiſtorian, which have a tendency to invalidate the accuſation ſo injurious to our poet. The events I mean are, the fate of Annæus, and the eſcape of Atilla, the two parents of Lucan. The former died in conſequence of an accuſation brought againſt him, after the death of his ſon, by Fabius Romanus, who had been an intimate with Lucan, and forged ſome letters in his name, with the deſign of proving his father concerned in the conſpiracy. Theſe letters were produced to Nero, who ſent them to Annæus, from an eager deſire, ſays Tacitus, to get poſſeſſion of his wealth. From this fact two inferences may be drawn, according to the different lights in which it may be conſidered:—If the accuſation againſt Annæus was juſt, it is clear that Lucan had not betrayed his father, and he appears the leſs likely to have endangered by his confeſſion the life of a parent, to whom he owed a ſtill tenderer regard:—If Annæus was not involved in the conſpiracy, and merely put to death by Nero for the ſake of his treaſure, we may the more readily believe, that the tyrant who murdered the father from avarice, might calumniate the ſon from envy. But the eſcape of Atilla affords us the ſtrongeſt reaſon to conclude that Lucan was perfectly innocent of the abject and unnatural treachery of which Tacitus has ſuppoſed him guilty. Had the poet really named his mother as an accomplice, would the vindictive and ſanguinary Nero have ſpared the life of a woman whoſe family he deteſted, particularly when other females were put to death for their ſhare in the conſpiracy? That Atilla was not in that number, the hiſtorian himſelf informs us in the following remarkable ſentence, "Atilla mater Annæi Lucani, ſine abſolutione, ſine ſupplicio, diſſimulata;" thus tranſlated by Gordon: "The information againſt Atilla, the mother of Lucan, was diſſembled; and, without being cleared, ſhe eſcaped unpuniſhed."

The preceding remarks will, our author hopes, vindicate to every candid mind the honour of Lucan, whoſe firmneſs and intrepidity of character are indeed very forcibly diſplayed in that picture of his death which Tacitus himſelf has given us. He was condemned to have his veins cut, as his uncle Seneca had before him. Lucan, "while his blood iſſued in ſtreams, perceiving his feet and hands to grow cold and ſtiffen, and life to retire by little and little from the extremities, while his heart was ſtill beating with vital warmth, and his faculties nowiſe impaired, recollected ſome lines of his own, which deſcribed a wounded ſoldier expiring in a manner that reſembled this. The lines themſelves he rehearſed; and they were the laſt words he

* In his Eſſay on Epic Poetry.

Lucan. he ever uttered." The critics differ concerning the verses of the Pharſalia which the author quoted in ſo memorable a manner. The two paſſages he is ſuppoſed to have repeated are the following; of which Lipſius contends for the latter.

Sanguis erant lachrymæ: quæcunque foramina novit
Humor, ab his largus manat cruor: ora redundant,
Et patulæ nares: ſudor rubet: omnia plenis
Membra fluunt venis: totum eſt pro vulnere corpus.
Lib. ix. v. 814.

Now the warm blood at once, from ev'ry part
Ran purple poiſon down, and drain'd the fainting heart.
Blood falls for tears; and o'er his mournful face
The ruddy drops their tainted paſſage trace.
Where'er the liquid juices find a way,
There ſtreams of blood, there crimſon rivers ſtray,
His mouth and guſhing noſtrils pour a flood,
And ev'n the pores ooze out the trickling blood;
In the red deluge all the parts lie drown'd,
And the whole body ſeems one bleeding wound. Rowe.

Scinditur avulſus; nec ſicut vulnere ſanguis
Emicuit lentus; ruptis cadit undique venis,
Diſcurſuſque animæ, diverſa in membra meantis,
Interceptus aquis. Lib. iii. v. 638.

No ſingle wound the gaping rupture ſeems,
Where trickling crimſon wells in ſlender ſtreams;
But, from an op'ning horrible and wide,
A thouſand veſſels pour the burſting tide:
At once the winding channels' courſe was broke,
Where wand'ring life her mazy journey took;
At once the currents all forgot their way,
And loſt their purple in the azure ſea. Rowe.

Lucan. Such was the death of Lucan before he had completed his 27th year.—His wife, Polla Argentaria, is ſaid to have tranſcribed and corrected the three firſt books of the Pharſalia after his death. It is much to be regretted (Mr Hayley obſerves) that we poſſeſs not the poem which he wrote on the merits of this amiable and accompliſhed woman; but her name is immortalized by two ſurviving poets of that age. The veneration which ſhe paid to the memory of her huſband is recorded by Martial; and more poetically deſcribed in that pleaſing and elegant little production of Statius, *Genethliacon Lucani*, a poem ſaid to have been written at the requeſt of Argentaria. The author, after invoking the poetical deities to attend the ceremony, touches with great delicacy and ſpirit on the compoſitions of Lucan's childhood, which are loſt, and the Pharſalia, the production of his early youth: he then pays a ſhort compliment to the beauty and talents of Argentaria; laments the cruel fate which deprived her ſo immaturely of domeſtic happineſs; and concludes with an addreſs to the ſhade of Lucan, which, with Mr Hayley's tranſlation, we ſhall ſubjoin in a Note, as it ſeems to furniſh a ſtrong preſumption of Lucan's innocence in regard to one of the accuſations mentioned above (A). "Had he been really guilty of baſely endangering

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(A)
At tu, ſeu rapidum poli per axem
Famæ curribus arduis levatus,
Qua ſurgunt animæ potentiores,
Terras deſpicis et ſepulchra rides:
Seu pacis meritum nemus recluſæ
Felix Elyſiis tenes in oris,
Quo Pharſalica turba congregatur;
Et te nobile carmen inſonantem
Pompeii comitantur et Catones:
Tu magna ſacer et ſuperbus umbra
Neſcis Tartaron, et procul nocentum
Audis verbera, pallidumque viſa
Matris lampade reſpicis Neronem.
Adſis lucidus; et vocante Polla
Unam, quæſo, diem deos ſilentum
Exores; ſolet hoc patere limen
Ad nuptas redeuntibus maritis.
Hæc te non thiaſis procax doloſis
Falſi numinis induit figuras;
Ipſum ſed colit, et frequentat ipſum
Imis altius inſitum medullis;
Ac ſolatia vana ſubminiſtrat
Vultus, qui ſimili notatus, auro
Stratis prænitet, excubatque ſomno
Securæ. Procul hinc abite mortes;
Hæc vitæ genitalis eſt origo;
Cedat luctus atrox, geniſque manent
Jam dulces lachrymæ, dolorque feſtus
Quicquid fleverat ante nunc adoret.

But you, O! whether to the ſkies
On Fame's triumphant car you riſe,
(Where mightier ſouls new life aſſume)
And mock the confines of the tomb;
Or whether in Elyſium bleſt
You grace the groves of ſacred reſt,
Where the Pharſalian heroes dwell;
And, as you ſtrike your epic ſhell,
The Pompeys and the Catos throng
To catch the animating ſong;
Of Tartarus the dread controul
Binds not your high and hallow'd ſoul:
Diſtant you hear that wailing coaſt,
And ſee the guilty Nero's ghoſt
Grow pale with anguiſh and affright,
His mother flaſhing on his ſight.
Be preſent to your Polla's vows,
While to your honour'd name ſhe bows!
One day let your entreaties gain
From thoſe who rule the ſhadowy train!
Their gates have op'd to bleſs a wife,
And given a huſband back to life.
In you the tender fair invites
No fancied god with frantic rites:
You are the object of her prayers,
You in her inmoſt heart ſhe bears:
And ſtampt on mimic gold, your head
Adorns the faithful mourner's bed,
And ſooths her eyes before they cloſe,
The guardian of her chaſte repoſe.
Away with all funereal ſtate!
From hence his nobler life we date:
Let mourning change the pang ſevere,
To fond devotion's grateful tear!
And feſtal grief, its anguiſh o'er,
What it lamented, now adore!

endangering the life of his mother (ſays Mr Hayley), it is not probable that his wife would have honoured his memory with ſuch enthuſiaſtic veneration; or that Statius, in verſes deſigned to do him honour, would have alluded to *the mother* of Nero. If his character as a man has been injured by the hiſtorian (continues Mr Hayley), his poetical reputation has been treated not leſs injuriouſly by the critics. Quintilian, by a frivolous diſtinction, diſputes his title to be claſſed among the poets; and Scaliger ſays, with a brutality of language diſgraceful only to himſelf, that he ſeems rather to *bark* than to *ſing*. But theſe inſults may appear amply compenſated, when we remember, that in the moſt poliſhed nations of modern Europe, the moſt elevated and poetic ſpirits have been his warmeſt admirers; that in France he was idolized by Corneille, and in England tranſlated by Rowe.—The ſevereſt cenſures on Lucan have proceeded from thoſe who have unfairly compared his language to that of Virgil: but how unjuſt and abſurd is ſuch a compariſon! it is comparing an uneven block of porphyry, taken rough from the quarry, to the moſt beautiful ſuperficies of poliſhed marble. How differently ſhould we think of Virgil as a poet, if we poſſeſſed only the verſes which he wrote at that period of life when Lucan compoſed his Pharſalia! In the diſpoſition of his ſubject, in the propriety and elegance of diction, he is undoubtedly far inferior to Virgil; but if we attend to the bold originality of his deſign, and to the vigour of his ſentiments; if we conſider the Pharſalia as the rapid and uncorrected ſketch of a young poet, executed in an age when the ſpirit of his countrymen was broken, and their taſte in literature corrupted; it may juſtly be eſteemed as one of the moſt noble and moſt wonderful productions of the human mind."—Lucan wrote ſeveral poems; but we have none remaining beſide his *Pharſalia*, of which an excellent Engliſh verſion has been given by Mr Nicholas Rowe.

Lucanus, the *Stag-Beetle*, a genus of inſects of the order of coleoptera. See Entomology *Index*.

LUCAR de Baramelda (St), a handſome and conſiderable town of Spain, with a very good harbour, well defended, in Andaluſia. It was once the greateſt port in Spain, before the galleons unloaded their treaſure at Cadiz. It is ſeated at the mouth of the river Guadalquiver. W. Long. 6. 5. N. Lat. 36. 40.

Lucar de Guadiana (St), a ſtrong town of Spain, in Andaluſia, on the confines of Algarve; ſeated on the river Guadiana, with a little harbour. W. Long. 5. 59. N. Lat. 37. 32.

Lucar la Major (St), a ſmall town of Spain, in Andaluſia, with the title of a duchy. It is ſeated on the river Guadiana, in W. Long. 6. 32. N. Lat. 37. 21.

LUCARIA, a feaſt celebrated at Rome on the 18th of July, in memory of the flight of the Romans into a great wood, where they found an aſylum, and ſaved themſelves from deſtruction. This wood, in which they found protection, was ſituated between the Tyber and the *Via Salaria*. The enemies from whom the Romans fled were the Gauls.—On this feſtival, Plutarch tells us, it was cuſtomary to pay the actors, and ſuch as contributed to the public amuſement, with the money ariſing from the felling of wood. This money was called *lucar*. It is obvious, from what has been obſerved, that *lucar* and *lucaria* are derived from *lucus*, a grove.

LUCAS Jacobs, an eminent artiſt, more generally known by the name of *Lucas van Leyden*, or *Hugenſe*, was born at Leyden in 1494. He received his firſt inſtructions in the art of painting from his father Hugues Jacobs; but completed his ſtudies in the ſchool of Cornelius Engelbrecht. He gained much money by his profeſſion; and being of a generous turn of mind, he ſpent it freely, dreſſed well, and lived in a ſuperior ſtyle. It is ſaid, that, a few years before his death, he made a tour into Zealand and Brabant; and during his journey, a painter of Fluſhing, envious of his great abilities, gave him poiſon at an entertainment; which, though very ſlow, was too fatal in its effect, and put an end to his life, after ſix years languiſhing under its cruel influence. Others, denying the ſtory of the poiſon, attribute his death to his inceſſant induſtry. The ſuperiority of this artiſt's genius manifeſted itſelf in his infancy: for his works, even from the age of nine, were ſo excellent as to excite the admiration of all cotemporary artiſts; and when he was about 15, he painted a St Hubert, which gained him great applauſe. His tone of colouring (Mr Pilkington obſerves) is good; his attitudes (making a reaſonable allowance for the ſtiff German taſte) are well choſen; his figures have a conſiderable expreſſion in their faces, and his pictures are very highly finiſhed. He endeavoured to proportion the ſtrength of his colouring to the different degrees of diſtance in which his objects were placed: for in that early time, the true principles of perſpective were but little known, and the practice of it was much leſs obſerved. In the town hall at Leyden, the moſt capital picture of Lucas, the ſubject of which is the Laſt Judgement, is preſerved with great care; the magiſtrates having refuſed very large ſums which have been offered for it.

This artiſt painted not only in oil, but alſo in diſtemper and upon glaſs. Nor was he leſs eminent for his engraving than for his painting. He carried on a familiar and friendly correſpondence with Albert Durer, who was his cotemporary; and, it is ſaid, that as regularly as Albert Durer publiſhed one print, Lucas publiſhed another, without the leaſt jealouſy on either ſide, or wiſh to depreciate each other's merit. And when Albert came into Holland upon his travels, he was received by Lucas in a moſt cordial and affectionate manner. His ſtyle of engraving, however, according to Mr Strutt, differed conſiderably from that of Albert Durer, "and ſeems evidently to have been founded upon the works of Iſrael van Mechlen. His prints are very neat and clear, but without any powerful effect. The ſtrokes are as fine and delicate upon the objects in the front, as upon thoſe in the diſtances; and this want of variety, joined with the feebleneſs of the maſſes of ſhadow, give his engravings, with all their neatneſs, an unfiniſhed appearance, much unlike the firm ſubſtantial effect which we find in the works of Albert Durer. He was attentive to the minutiæ of his art. Every thing is carefully made out in his prints, and no part of them is neglected. He gave great character and expreſſion to the heads of his figures; but on examination of his works, we find the ſame heads

Lucas.

heads too often repeated. The hands and feet are rather mannered than correct; and when he attempted to draw the naked figure, he ſucceeded but very indifferently. He affected to make the folds of his draperies long and flowing; but his female figures are frequently ſo exceſſively loaded with girdles, bandages, and other ornamental trappings, that much of the elegance of the deſign is loſt. He engraved on wood, as well as on copper; but his works on the former are by no means numerous. They are, however, very ſpirited; though not equal, upon the whole, to thoſe of his friend Albert. The prints of this maſter are pretty numerous, but very ſeldom met with complete; eſpecially fine impreſſions of them. For though they are, generally ſpeaking, executed with the graver only, yet, from the delicacy of the execution, they ſoon ſuffered in the printing. Of his engravings the few following may be mentioned as among the principal. 1. *Mahomet ſleeping, with a prieſt murdered by his ſide, and another figure ſtealing his ſword*, a middling-ſized upright plate, dated 1508, ſaid to be one of his moſt early productions. 2. An *ecce homo*, a large plate, lengthwiſe, dated 1510. 3. *The crucifixion on Mount Calvary*, the ſame. 4. *The wiſe men's offering*, the ſame, dated 1513. 5. *Return of the prodigal ſon*, a middling ſized plate, lengthwiſe, dated 1518. 6. A large print lengthwiſe, called *the dance of Magdalen*, dated 1519. 7. His own *portrait*, a ſmall upright plate, dated 1525. 8. *David playing before Saul*, a middling-ſized upright plate, dated———. This is a very fine print; the expreſſion of Saul's countenance, in particular, is admirable. 9. A print known by the name of *Uleſpiegle*, which is the ſcarceſt of all the works of this maſter. It is in the collection of the king of France; and ſaid by Marolles, and other maſters, to be unique. But Baſan informs us, that M. Mariette had alſo an impreſſion of this plate; and it has been ſince found in one or two other collections. It repreſents a travelling bagpiper with his family; himſelf playing as he goes along, and carrying two children in a baſket at his back; his wife trudging by his ſide, ſupporting with one hand an infant on her ſhoulder, and with the other leading an aſs loaded with two baſkets, having two children in each; and another child going before, with a little dog, completes the ſingular groupe. This rare print is dated 1520, and is known to have been ſold for 16 louis d'ors.—It is nearly 7½ inches high by 4¾ broad; and has been twice copied. One of the copies is the reverſe way: but the other is the ſame way with the original; and though not ſo well executed, might without a compariſon be miſtaken for it.

Lucas, *Richard*, D. D. a learned Engliſh divine, was born in 1648, and ſtudied at Oxford; after which he entered into holy orders, and was for ſome time maſter of the free ſchool at Abergavenny. Being eſteemed an excellent preacher, he became vicar of St Stephen's, Coleman ſtreet, in London, and lecturer of St Olave's in Southwark. He was doctor of divinity; and in 1696 was inſtalled prebendary of Weſtminſter; His ſight began to fail him in his youth; and he totally loſt it in his middle age. He was greatly eſteemed for his piety and learning; and publiſhed ſeveral works, particularly, 1, Practical Chriſtianity. 2. An Inquiry after Happineſs. 3. Several ſermons. 4. A Latin tranſlation of the Whole Duty of Man. He died in 1715.

Lucas ‖ Lucca.

LUCCA, a ſmall republic of Italy on the coaſt of the Mediterranean, between the territory of Genoa on the weſt, Modena on the north, and Tuſcany on the eaſt. According to Keyſler, it is only about 30 miles in circumference, but is exceeding fertile and populous. It contains, beſides the city of Lucca, 150 villages. The number of inhabitants is computed at 120,000. The government is lodged in a gonfalonier, whoſe power is much the ſame with that of the doges of Venice and Genoa. He is aſſiſted by nine counſellors: but the power of all the ten continues only for two months: during which time they live in the ſtate-palace, and at the public expence. They are choſen out of the great council, which conſiſts of 240 nobles; but even this council is changed by a new election every two years. The revenues of the republic are about 400,000 ſcudi or crowns; out of which they maintain 500 men by way of regular force, and 70 Swiſs as a guard to their acting magiſtrates. The city of Lucca is ſituated in a plain, terminating in moſt delightful eminences, adorned with villas, ſummer-houſes, corn-fields, and plantations of every kind; ſo that nothing either for uſe or for pleaſure is here wanting. The city, which is about three Italian miles in circumference, has regular well-lined fortifications; and its ſtreets though irregular, are wide, well paved, and full of handſome houſes. The number of its inhabitants is computed to be above 40,000; and they carry on large manufactures, eſpecially of ſilk ſtuffs. Lucca has a biſhop, who enjoys ſeveral extraordinary privileges; and its cathedral is Gothic. The city ſtands in E. Long. 11. 27. N. Lat. 43. 52.

LUCENTI, LUCENTIA, or *Lucentum*, a town of the Hither Spain, now Alicant, a ſea-port of Valencia. W. Long. 32′. Lat. 38°. 37′.

LUCERES, in Roman antiquity, the third in order of the three tribes into which Romulus divided the people; including all foreigners: ſo called from the *lucus* or grove, where Romulus opened an aſylum.

LUCERIA, in *Ancient Geography*, a town of Apulia in Italy; which in Strabo's time ſtill exhibited marks of Diomed's ſovereignty in thoſe parts. Ptolemy has *Nuceria*; whether from miſtake, or the cuſtom of his time, uncertain. Now *Nocera de Pagani*, in the kingdom of Naples. E. Long. 15. 0. N. Lat. 40. 40.

LUCERIUS, in *Mythology*, a name given to Jupiter, as *Luceria* was given to Juno, as the deities which gave light to the world.

LUCERNE, one of the 13 cantons of Swiſſerland. It holds the third place among the 13; and is the head of the Catholic cantons. Though leſs than Zurich, and conſequently much leſs than Berne, it is, however, far more extenſive than any of the reſt, being 15 or 16 leagues long, and eight broad. The population is eſtimated at 100,000. Even the mountainous part is not barren, but abundant in wood and paſture, furniſhing cattle, hides, cheeſe, and butter, for exportation. All the north part is fertile in grain, fruit, and hay; ſupplying ſufficient for the conſumption of the inhabitants; but as the mountaineers of the little cantons come to their market for corn, the people of Lucerne purchaſe this commodity from other parts of Swiſſerland, but eſpecially from Alſace and

Savoin. Their manufactures are very inconſiderable; conſiſting only in a little ſilk and cotton thread.—The government is oligarchical. The councils are choſen from among 500 citizens only. The great council of 64 members is the nominal ſovereign; but in fact the power reſides in the ſenate, or little council of 36, having for their chiefs the two avoyers.—The whole canton profeſſes the Roman Catholic religion. The pope's nuncio, with the title of legate *à latere*, uſually reſides at Lucerne.—They threw off the Auſtrian yoke in 1352, and by entering into a perpetual alliance with the three ancient cantons, they gave ſuch weight to the confederacy, as to enable it in 1386 to reſiſt all the efforts of the enemy at the bloody battle of Sempach.

The *town of Lucerne* is ſituated at the extremity of a moſt beautiful lake of the ſame name, where the river Reuſs iſſues from it. The buildings are ancient, and the ſtreets narrow; nor is Lucerne populous in proportion to its extent, the inhabitants being only between 3000 and 4000. Since this is the great paſſage to Italy by Mount St Gothard, and the merchandiſe which paſſes the Alps on mules, and is to be tranſported by the rivers Reuſs, Aar, and Rhine, is all depoſited here, it might have a flouriſhing trade if arts and manufactures were attended to. The Reuſs ſeparates the town into two unequal parts, which are connected by three bridges: one wide for carriages; and two narrow covered ones for foot paſſengers: beſides theſe, there is a fourth over an arm of the lake, to paſs to the cathedral. Three of theſe bridges have old bad paintings of the Dance of Death, and the Hiſtory of the Bible, and of Swiſſerland. They make a commodious dry walk for the inhabitants.—Of religious edifices, the principal are the cathedral, or collegiate church of St Leger; the convent of Cordeliers; the college of the Jeſuits; the convent of Capuchins, and two convents of nuns. Of the ſecular buildings, the hotel de ville is the principal. The arſenal is well furniſhed. The water tower is remarkable only for its poſition and antiquity; it is ſaid to have been a pharos or lighthouſe. What greatly attracts the notice of moſt ſtrangers is, a plan in relief of part of the cantons of Lucerne, Zug, and Berne, and the whole of Schweitz, Uri, and Underwald, executed by General Pfiffer on a large ſcale. He has completed about 60 ſquare leagues; the plan is 12 feet long, and nine and a half broad: every mountain is accurately meaſured; and every object diſtinctly placed.

The *lake of Lucerne* exhibits greater variety and more picturеſque ſcenery than any other of the Swiſs lakes. It is ſeven leagues long in a right line, and three wide about Kuſſnacht; but the ſhape is very irregular. The whole ſouth ſide is bordered by high mountains; but the north exhibits hills of no great height. The narrow gulf that extends towards the weſt, is bordered on the weſt and north weſt by Mount Pilat, which is a ſingle mountain riſing boldly more than 6000 feet above the lake: and on the [illegible] by Mount [illegible]. Stanz Stad, belonging to the canton of Underwald, is on this ſide: [illegible] the lake is deeper. Kuſſnacht is [illegible] other [illegible] which extends towards the eaſt and is [illegible] the country to the weſt of theſe gulfs, and part of it to the north of the latter, belongs to the canton of Lucerne; but that which is to the ſouth and north-eaſt is dependant on the canton of Zug. All the mountains on the left ſhore of the lake belong to the canton of Underwald; thoſe on the right, partly to the canton of Uri, partly to that of Schweitz, partly to the little republic of Gerſaw, but principally to the canton of Lucerne.

LUCERNE, in *Botany*. See MEDICAGO, BOTANY *Index*.—For the culture of this plant, ſee AGRICULTURE *Index*.

LUCIA, ST, one of the Caribbee iſlands in the Weſt Indies, about 22 miles long, and 11 broad, the middle of it lying in N. Lat. 39. 14. W. Long. 27. 0. It was firſt ſettled by the French in 1650; but was reduced by the Engliſh in 1664, who evacuated it in 1666. The French immediately reſettled the iſland, but were again driven away by the Caribbs. As ſoon as the ſavages were gone, the former inhabitants returned, but only for a ſhort time; for being afraid of falling a prey to the firſt privateer that ſhould viſit their coaſts, they removed either to other French ſettlements that were ſtronger, or which they might expect to be better defended. There was then no regular culture or colony at St Lucia; it was only frequented by the inhabitants of Martinico, who came thither to cut wood, and to build canoes, and who had conſiderable docks on the iſland. In 1718 it was again ſettled by the French; but four years after, it was given by the court of London to the duke of Montague, who was ſent to take poſſeſſion of it. This occaſioned ſome diſturbance between the two courts; which was ſettled, however, by an agreement made in 1731, that, till the reſpective claims ſhould be finally adjuſted, the iſland ſhould be evacuated by both nations, but that both ſhould wood and water there. This precarious agreement furniſhed an opportunity for private intereſt to exert itſelf. The Engliſh no longer moleſted the French in their habitations; but employed them as their aſſiſtants in carrying on with richer colonies a ſmuggling trade, which the ſubjects of both governments thought equally advantageous to them. This trade has been more or leſs conſiderable till the treaty of 1763, when the property of St Lucia was ſecured to the crown of France. After that time the colony flouriſhed conſiderably. In the beginning of the year 1772, the number of white people amounted to 2018 ſouls, men, women, and children; that of the blacks to 663 free men, and 12,795 ſlaves. The cattle conſiſted of 928 mules or horſes, 2070 head of horned cattle, and 3184 ſheep or goats. There were 38 ſugar plantations, which occupied 978 pieces of land; 5,595,889 coffee-trees; 1,321,600 cocoa plants; and 367 plots of cotton. There were 706 dwelling places. The annual revenue at that time was about 175,000l. which, according to the Abbé Raynal, muſt have increaſed one-eighth yearly for ſome time. It was taken by the Britiſh in 1778; reſtored to France in 1783. It fell again into the hands of the Britiſh in 1794, was evacuated in 1795, and was again retaken in 1796.

The ſoil of St Lucia is tolerably good, even at the [illegible], and is much better the farther one advances into the country. The whole of it is capable of cultivation, except ſome high and craggy mountains which bear evident marks of old volcanoes. In one deep valley there are ſtill eight or ten ponds, the water of which boils up in a dreadful manner, and retains ſome of its heat at the diſtance of 6000 toiſes from its reſervoirs. The air in the inland parts, like that of all other uninhabited countries, is foul and unwholeſome; but grows leſs noxious as the woods are cleared and the ground laid open. On ſome parts of the ſea coaſt, the air is ſtill more unhealthy, on account of ſome ſmall rivers which ſpring from the foot of the mountains, and have not ſufficient ſlope to waſh down the ſands with which the influx of the ocean ſtops up their mouths, by which means they ſpread themſelves into unwholeſome marſhes on the neighbouring grounds.

Lucia, *St*, a high and mountainous iſland of Africa, and one of thoſe of Cape Verde, is about nine leagues long, and lies in the latitude of 16° 18′ N. according to the Engliſh geographers; but according to all others, it is a degree farther to the northward. On the eaſt-ſouth-eaſt ſide is a harbour, with a bottom and ſhore of white ſand; but its beſt road is oppoſite to St Vincent's to the ſouth-weſt, where there are at leaſt 20 fathoms of water. On the weſt ſide there is no water: it abounds with goats, ſea and land fowl, tortoiſes, &c. but whether it hath any inhabitants is not certainly known.

LUCIAN, a celebrated Greek author in the firſt century, was born at Samoſata, of obſcure parents, in the reign of the emperor Trajan. He ſtudied law, and practiſed ſome time as an advocate; but growing weary of the wrangling oratory of the bar, he commenced rhetorician. He lived to the time of Marcus Aurelius, who made him regiſter of Alexandria in Egypt; and, according to Suidas, he was at laſt worried by dogs. Lucian was one of the fineſt wits in all antiquity. His Dialogues, and other works, are written in Greek. In theſe he has joined the uſeful to the agreeable, inſtruction to ſatire, and erudition to elegance; and we everywhere meet with that fine and delicate raillery which characterizes the Attic taſte.—Thoſe who cenſure him as an impious ſcoffer at religion, have reaſon on their ſide, if religion conſiſted in the theology of the Pagan poets, or in the extravagant opinions of philoſophers; for he perpetually throws ſuch ridicule on the gods and philoſophers, with their vices, as inſpires hatred and contempt for them; but it cannot be ſaid that he writes anywhere againſt an overruling providence.

LUCIANISTS, or **Lucanists**, a religious ſect, ſo called from Lucianus, or Lucanus, a heretic of the ſecond century, being a diſciple of Marcion, whoſe errors he followed, adding ſome new ones to them. Epiphanius ſays he abandoned Marcion; teaching that people ought not to marry, for fear of enriching the Creator: and yet other authors mention that he held this error in common with Marcion and other Gnoſtics. He denied the immortality of the ſoul; aſſerting it to be material.

There was another ſect of Lucianiſts, who appeared ſome time after the Arians. They taught, that the Father had been a father always, and that he had the name even before he begot the Son; as having in him the power or faculty of generation; and in this manner they accounted for the eternity of the Son.

LUCID INTERVALS, the fits of lunatics or madmen, wherein the phrenzy leaves them in poſſeſſion of their reaſon.

LUCIFER, according to the poets, was the ſon of Jupiter and Aurora. In aſtronomy, Lucifer is the bright planet Venus, which either goes before the ſun in the morning, for 290 days, and is our morning ſtar; or in the evening follows the ſun, during the ſame time, and then is called *Heſperus* or the evening ſtar.

LUCIFERA, in *Mythology*, a ſurname given to Diana, under which title ſhe was invoked by the Greeks in childbed. She was repreſented as covered with a large veil, interſperſed with ſtars, bearing a creſcent on her head, and holding in her hand a lighted flambeau.

LUCIFERIANS, a religious ſect, who adhered to the ſchiſm of Lucifer, biſhop of Cagliari, in the fourth century, who was baniſhed by the emperor Conſtantius, for having defended the Nicene doctrine concerning the three Perſons in the Godhead.—St Auguſtine ſeems to intimate, that they believed the ſoul, which they conſidered as of a carnal nature, to be tranſmitted to the children from their fathers. Theodoret ſays, that Lucifer was the author of a new error. The Luciferians increaſed mightily in Gaul, Spain, Egypt, &c. The occaſion of the ſchiſm was, that Lucifer would not allow any acts he had done to be aboliſhed. There were but two Luciferian biſhops, but a great number of prieſts and deacons. The Luciferians bore a peculiar averſion to the Arians.

LUCILIUS, **Caius**, a Roman knight, and a Latin poet, was born at Sueſſa in Italy, about 140 B. C. He ſerved under Scipio Africanus in the war with the Numantines; and was in great favour with that celebrated general, and with Lælius. He wrote 30 books of ſatires, in which he laſhed ſeveral perſons of quality very ſharply. Some learned men aſcribe the invention of ſatire to him; but M. Dacier has maintained, with great probability, that Lucilius only gave a better turn to that kind of poetry, and wrote it with more wit and humour than his predeceſſors Ennius and Pacuvius had done. His fragments have been carefully collected by Francis Douza at Leyden in 1599, with notes. But they require ſtill to be better illuſtrated by ſome learned critic.

LUCINA, a goddeſs among the Romans, who preſided over women in labour. Some take her to be Diana, others Juno. She was called *Lucina*, becauſe ſhe brought children to the light; from the Latin word *lux*, "light."

LUCIUS, the ſpecific name of the pike. See Esox, Ichthyology *Index*.

LUCONIA. See Manilla.

LUCRETIA, the famous Roman matron, wife of Collatinus, and the cauſe of the revolution in Rome from a monarchy to a republic: this lady being raviſhed by Sextus, the eldeſt ſon of Tarquin king of Rome, ſtabbed herſelf, 509 B. C. See the article Chastity. The bloody poniard, with her dead body expoſed to the ſenate, was the ſignal of Roman liberty; the expulſion of the Tarquins, and abolition of the regal dignity, was inſtantly reſolved on, and carried into execution. See Rome.

LUCRETIUS, or **Titus Lucretius Carus**, one of the most celebrated of the Latin poets, was born of an ancient and noble Roman family, and ſtudied at Athens, where he became one of Epicurus's ſect. He acquired great reputation by his learning and eloquence; but in the flower of his age fell into a frenzy, occaſioned by a philtre given him by his wife, who was paſſionately fond of him. Lucretius, during the intervals of his madneſs, put Epicurus's doctrines into verſe, and compoſed his ſix books *De Rerum Natura*, which are ſtill extant. It is ſaid that he killed himſelf in a fit of madneſs, in the 49th year before the Chriſtian era, when 51 years old. The moſt correct edition of Lucretius is that of Simon de Coline. The cardinal de Polignac has refuted Lucretius's arguments, in his excellent Latin poem entitled *Anti-Lucretius*. His poem *De Rerum Natura* has been tranſlated into Engliſh by Mr Creech.

LUCRINUS LACUS, in *Ancient Geography*, a lake of Campania, between Baiæ and Puteoli, famous for its oyſters (Horace, Martial, Juvenal): *Lucrinenſes* (Cicero), the people dwelling on it. Now a perfect bay ſince the earthquake in 1538.

LUCULLUS, Lucius Lucinius, a Roman general celebrated for his eloquence, his victories, and his riches. In his youth he made a figure at the bar; and being afterwards made quæſtor in Aſia, and prætor in Africa, governed thoſe provinces with great moderation and juſtice. Scarce was he known as a military man, when he twice beat the fleet of Hamilcar, and gained two great victories over him. His happy genius was greatly improved by ſtudy; for he employed his leiſure in reading the beſt authors on military affairs. Being made conſul with Aurelius Cotta, during the third war with Mithridates king of Pontus, he was ſent againſt this prince: and this expedition was attended with a ſeries of victories, which did him leſs honour than an act of generoſity towards his colleague; who, willing to take advantage of his abſence to ſignalize himſelf by ſome great exploit, haſtened to fight Mithridates; but was defeated and ſhut up in Chalcedonia; where he muſt have periſhed, if Lucullus, ſacrificing his reſentment to the pleaſure of ſaving a Roman citizen, had not flown to his aſſiſtance, and diſengaged him. All Pontus then ſubmitted to Lucullus; who being continued in his government of Aſia, entered the territories of Tigranes, the moſt powerful king in Aſia. That prince marched with a formidable army againſt Lucullus: who defeated him with a handful of men, and killed great numbers of his forces; took Tigranocertes, the capital of his kingdom; and was ready to put an end to the war, when the intrigues of a tribune got him depoſed, and Pompey nominated in his room. Lucullus having brought home prodigious riches, now gave himſelf up to exceſſive luxury; and his table was ſerved with a profuſion till that time unknown. He brought from the Eaſt a great number of books, which he formed into a library, and gave admittance to all men of learning, who frequented it in great numbers. Toward the end of his life, he fell into a kind of madneſs; and Lucullus, his brother was appointed his guardian. He is ſaid to have been the firſt who brought cherries into Europe, having brought the grafts from the kingdom of Pontus.

LUCUS, in general, denotes a wood or grove ſacred to a deity; ſo called *à lucendo*, becauſe a great number of lights were uſually burning in honour of the god (Iſidorus); a practice common with idolaters, as we learn from Scripture: hence Homer's *[illegible]*.

LUD, a Britiſh king mentioned in our old chronicles, and ſaid to have reigned about the year of the world 3878. He is reported to have enlarged and walled about *Troynovant*, or New Troy, where he kept his court, and made it his capital. The name of *London* is hence derived from *Lud's town*; and *Ludgate* from his being buried near it: but this is only one among many other derivations of the name of London; which are at leaſt equally probable. See LONDON.

LUDAMAR, a Mooriſh kingdom in the interior part of Africa, the capital of which is ſituated in N. Lat. 15. 0. W. Long. 60 50. which Mr Park conſiders as little ſuperior to a deſert. The Moors of Ludamar ſubſiſt chiefly on the fleſh of their cattle.

The barrenneſs of the country is ſuch, that it furniſhes few materials for manufacture: but the inhabitants contrive to weave a ſtrong cloth, with which their tents are covered; the thread is ſpun by the women from goats hair, and with the hides of their cattle they furniſh ſaddles, bridles, pouches, and other articles of leather. They can alſo convert the native iron procured from the negroes into ſpears, knives, and pots for boiling their food; but they purchaſe their fire-arms and other weapons of a ſimilar nature from the Europeans, in exchange for ſlaves.

Their ideas of female perfection are truly ſingular, ſince a woman, to have the ſmalleſt pretenſions to beauty, muſt be one who requires a ſlave under each arm to ſupport her as ſhe walks; and a perfect beauty, according to Mr Park, is a load for a camel.

The wealth of the Moors chiefly conſiſts in their numerous herds of cattle, yet the majority of the people ſpend their days in a ſtate of idleneſs. The tent of the king is the common place of rendezvous for the indolent, where they appear to enjoy an unlimited liberty of ſpeech; yet in the praiſe of their ſovereign they are wholly unanimous, ſinging ſongs to his honour, which never fail to be filled with the groſſeſt adulation. The king ſometimes eats out of the ſame baſon with the driver of his camels, and during the heat of the day repoſes himſelf upon the ſame bed.

Cavalry conſtitute the chief military ſtrength of Ludamar, which are well mounted, and are very expert in attacking by ſurpriſe. The horſe of every ſoldier is furniſhed by himſelf, as alſo his military implements, conſiſting of a large ſabre, a double-barrelled gun, a red leather bag for holding his balls, and a powder-horn flung over his ſhoulder. He has no pay, and his only compenſation ariſes from plunder.

They have no intercourſe with civilized nations, yet they boaſt an advantage over the negroes, as they poſſeſs, though in a very limited degree, the knowledge of letters. They are eſteemed the vaineſt, proudeſt, and moſt bigotted, ferocious, and intolerant of all the nations of the earth, blending in their character the blind ſuperſtition of the negro with the ſavage cruelty and treachery of the Arab. It was with the utmoſt difficulty that Mr Park made his eſcape from this cruel and inhoſpitable people.

LUDI, a term uſed for ſhows and public repreſentations made by the Romans, for the entertainment of the people. See GAMES.

For an account of the particular games of Greece and Rome, as the Iſthmian, Nemean, Olympic, &c. ſee ISTHMIAN, &c.

LUDIUS, a celebrated painter, lived in the reign of Auguſtus Cæſar, and excelled in grand compoſitions. He was the firſt who painted the fronts of houſes in the ſtreets of Rome; which he beautified with great variety of landſcapes, and many other different ſubjects.

LUDLOW, EDMUND, ſon of Sir Henry Ludlow, was born at Maidenhead, and educated in Trinity college, Oxford. His father oppoſing the king's intereſt, Mr Ludlow joined with the ſame party, and was preſent at the battle of Edgehill as a volunteer under the earl of Eſſex. Upon the death of his father, he was choſen knight of the ſhire for Wilts, and obtained the command of a regiment of horſe for the defence of that country. He was one of King Charles I.'s judges: after whoſe death he was ſent by the parliament into Ireland, in quality of lieutenant-general of the horſe; which employment he diſcharged with diligence and ſucceſs till the death of the lord-deputy Ireton, when he acted for ſome time as general, though without that title; Cromwell, who knew him to be ſincerely in the intereſt of the commonwealth, always finding out ſome pretext to hinder the conferring of that character upon him. The laſt ſtroke had been given by Ludlow to the Iriſh rebellion, if the uſurpation of Cromwell had not prevented it. Under his power he never acted; and though Cromwell uſed his utmoſt efforts, he remained inflexible. After Cromwell's death, he endeavoured to reſtore the commonwealth; but Charles II. being recalled, he thought proper to conceal himſelf, and eſcaped into Switzerland, where he ſettled. After the revolution, he came over into England, in order to be employed in Ireland againſt King James: but appearing publicly in London, it gave great offence; and an addreſs was preſented by Sir Edward Seymour to King William III. for a proclamation in order to apprehend Colonel Ludlow, attainted for the murder of King Charles I. Upon this he returned to Switzerland, where he died. During his retirement in Switzerland he wrote his Memoirs.

LUDLOW, a town of Shropſhire in England, ſituated at the conflux of the Teme and Corve, 18 miles from Shrewſbury, and 138 from London. The preſident of the council of the marches, eſtabliſhed by Henry VIII. generally kept his courts in it, by which the town was much benefited, theſe courts not having been aboliſhed till the 1ſt of William and Mary. Its neighbourhood to Wales makes it a great thoroughfare, and engages many of the Welſh to ſend their children of both ſexes to it for education. It was incorporated by Edward IV. and among other privileges has that of trying and executing criminals within itſelf. It is one of the neateſt towns in England, with walls and ſeven gates. It is divided into four wards; and is governed by 2 bailiffs, 12 aldermen, 25 common-councilmen, a recorder, a town-clerk, ſteward, chamberlain, coroner, &c. From the caſtle on the top of the hill on which the town ſtands is a moſt delightful proſpect. In an apartment of the outer gatehouſe Samuel Butler is ſaid to have written the firſt part of Hudibras. Of this caſtle, which was beſieged and taken by King Stephen, ſome of the offices are fallen down, and great part of it turned into a bowling-green; but part of the royal apartments and the ſword of ſtate are ſtill left. The walls were at firſt a mile in compaſs, and there was a lawn before it for near two miles, of which much is now encloſed. The battlements are very high and thick, and adorned with towers. It has a neat chapel, where are the coats of arms of abundance of Welſh gentry, and over the ſtable-doors are the arms of Queen Elizabeth, the earls of Pembroke, &c. This caſtle was a palace of the prince of Wales, in right of his principality. The river Teme has a good bridge over it, ſeveral wears acroſs it, and turns a great many mills. Here is a large parochial church, which was formerly collegiate; in the choir whereof is an inſcription relating to Prince Arthur, elder brother to King Henry VIII. who died here, and whoſe bowels were here depoſited, though it is ſaid his heart was taken up ſome time ago in a leaden box. In this choir is a cloſet, commonly called *God's Houſe*, where the prieſts uſed to keep their conſecrated utenſils; and in the market-place is a conduit, with a long ſtone croſs on it, and a niche wherein is the image of St Laurence, to whom the church was dedicated. On the north ſide of the town there was a rich priory, whereof there are few ruins to be ſeen except thoſe of its church. Here are an alms-houſe for 30 poor people, and two charity-ſchools where 50 boys and 30 girls are both taught and clothed. It has a market on Monday, and three leſſer ones on Wedneſday, Friday, and Saturday. Its fairs are on the Tueſday Eaſter, Whit-Wedneſday, Auguſt 21. Sept. 28. and Dec. 8. Proviſions are very cheap here; and at the annual horſe races there is the beſt of company. The country round is exceedingly pleaſant, fruitful, and populous, eſpecially that part called the *Corveſdale*, being the vale on the banks of the river Corve. Ludlow ſends two members to parliament.

LUDOLPH, JOB, a very learned writer of the 17th century, was born at Erfurt in Thuringia. He travelled much, and was maſter of 25 languages, viſited libraries, ſearched after natural curioſities and antiquities everywhere, and converſed with learned men of all nations. He publiſhed a Hiſtory of Ethiopia, and other curious books.

LUDOLPH, *Henry William*, nephew of Job above mentioned, was born at Erfurt in 1655. He came over to England as ſecretary to M. Lenthe, envoy from the court of Copenhagen to that of London; and being recommended to Prince George of Denmark, was received as his ſecretary. He enjoyed this office for ſome years, until he was incapacitated by a violent diſorder; when he was diſcharged with a handſome penſion: after he recovered, he travelled into Muſcovy, where he was well received by the czar, and where his knowledge made the Muſcovite prieſts ſuppoſe him to be a conjurer. On his return to London in 1694, he was cut for the ſtone; and as ſoon as his health would permit, in acknowledgement of the civilities he had received in Muſcovy, he wrote a grammar of their language, that the natives might learn their own tongue in a regular method. He then travelled into the Eaſt, to inform himſelf of the ſtate of the Chriſtian church in the Levant: the deplorable condition of which induced him, after his return, with the aid of the biſhop of Worceſter, to print an edition of the New Teſtament in the vulgar Greek, to preſent to the Greek church. In 1709, when ſuch numbers of Palatines came over to England, Mr Ludolph was appointed by Queen Anne one of the commiſſioners to manage the charities raiſed for them; and he died early the following year. His collected works were publiſhed in 1712.

LUDWIDGIA, a genus of plants belonging to the tetrandria claſs, and in the natural method ranking under the 17th order, *Calycanthemæ*. See BOTANY *Index*.

LUES, among phyſicians, is in general uſed for a diſeaſe of any kind; but in a more particular ſenſe is reſtricted to contagious and peſtilential diſeaſes; thus the *lues Gallica*, or *venerea*, ſignifies the venereal diſeaſe. See MEDICINE *Index*.

LUFF, the order from the pilot to the ſteerſman to put the helm towards the *lee*-ſide of the ſhip, in order to make the ſhip ſail nearer the direction of the wind. Hence, luff round, or luff a-lee, is the exceſs of this movement, by which it is intended to throw the ſhip's head up in the wind, in order to tack her, &c. A ſhip is accordingly ſaid to ſpring her luff when ſhe yields to the effort of the helm, by ſailing nearer to the line of the wind than ſhe had done before. See alſo *HAULING the Wind*.

LUFF Tackle, a name given by ſailors to any large tackle that is not deſtined for a particular place, but may be variouſly employed as occaſion requires. It is generally ſomewhat larger than the jigger tackle, although ſmaller than thoſe which ſerve to hoiſt the heavier materials into and out of the veſſel, which latter are the main and fore tackles, the ſtay and quarter tackles, &c.

LUG-SAIL, a ſquare ſail, hoiſted occaſionally on the maſt of a boat or ſmall veſſel upon a yard which hangs nearly at right angles with the maſt. Theſe are more particularly uſed in the barca longas, navigated by the Spaniards in the Mediterranean.

LUGDUNUM, in *Ancient Geography*, the capital of the Seguſiani in Gallia Celtica, ſituated at the conflux of the Arar and Rhodanus, on an eminence, as the Celtic term *dune* ſignifies; built by Manutius Plancus under Auguſtus, while commanding in that part of Gaul; and whither he led a colony. Now *Lyons*, capital of the Lyonnois.

LUGDUNUM Batavorum, in *Ancient Geography*, a town of the Batavi in Gallia Belgica. Now *Leyden* in Holland.

LUGDUNUM Converarum, in *Ancient Geography*, a town of Gaul in Aquitain, at the foot of the Pyrenees. Now S. *Bertrand*, in Gaſcony.

LUGEUS LACUS, in *Ancient Geography*, a lake of Iapydia, the weſtmoſt diſtrict of Illyricum, to the ſouth of the Save, and near the head of the Arſia. Now commonly called the *Zirchnitz Lake*, from a ſmall adjoining town. It is locked on every ſide with mountains; from which ſcanty currents run down; the leſs in quantity their waters, becauſe drank up by the earth; till at length they are ſwallowed up in rocky furrows, ſo formed as to reſemble artificial. In theſe the water being ſo redundant as to refuſe receiving any more, they regurgitate, and return the water with extraordinary celerity, which thus ſpreading itſelf, forms a lake, in moſt places 18 cubits deep. Theſe waters afterwards retire with no leſs celerity than they came on, not only through the furrows, but paſs through the whole of the bottom, as through a ſieve; which when perceived by the inhabitants, they directly ſtop up the larger apertures, and thus take large quantities of fiſh: when the lake is dry, they cut down their harveſt on the ſpot where they ſowed, and ſow again before the inundation comes on: and graſs ſhoots ſo quick on it, that it may be cut down in three weeks time, (Lazius, Wernherus).

LUGGERSHALL, a borough of Wiltſhire, 12 miles north of Saliſbury, and 75 north by weſt of London. It is an ancient borough by preſcription, though but a ſmall hamlet, near the foreſt of Chute, in a delightful country; and was the reſidence of ſeveral kings. It had formerly a caſtle. It is governed by a bailiff choſen yearly at the lord of the manor's court-leet. On the neighbouring downs there uſed to be horſe-races.

LUKE, ST, the evangeliſt, and the diſciple of the apoſtles, was originally of Antioch in Syria, and by profeſſion a phyſician. He particularly attached himſelf to St Paul, and was his faithful companion in his travels and labours. He went with him to Troas in Macedonia about the year 51. He wrote his goſpel in Achaia about the year 53; and, ten years after, the acts of the Apoſtles, which contains a hiſtory of 30 years. Of all the inſpired writers of the New Teſtament, his works are written in the moſt elegant Greek. It is believed that St Luke died at Rome, or in Achaia.

Goſpel of St LUKE, a canonical book of the New Teſtament. Some think that it was properly St Paul's Goſpel; and that, when the apoſtle ſpeaks of *his* Goſpel, he means what is called *St Luke's*. Irenæus ſays, that St Luke digeſted into writing what St Paul preached to the Gentiles; and Gregory Nazianzen tells us, that St Luke wrote with the aſſiſtance of St Paul.

St LUKE's the Evangeliſt's Day, a feſtival in the Chriſtian church, obſerved on the 18th of October.

LULA, a town of Swediſh Lapland; ſeated at the mouth of the river Lula, on the weſt ſide of the gulf of Bothnia, 42 miles ſouth-weſt of Tornea. E. Long. 21. 0. N. Lat. 64. 30.

LULA Lapmark, a province of Swediſh Lapland; bounded by that of Tornea on the north, by the Bothnic gulf on the eaſt, by Pithia Lapmark on the ſouth, and Norway on the weſt.

LULLI, JOHN BAPTIST, the moſt celebrated and moſt excellent muſician that has appeared in France ſince the revival of learning, was born at Florence. He was taken to France when very young by a perſon of quality; and he carried the art of playing on the violin to the higheſt perfection. Louis XIV. made him ſuperintendant of muſic. Some time after Perinna having introduced operas into France, and quarrelling with his company, he reſigned his privilege to Lulli. Operas were then carried to the utmoſt perfection by this celebrated muſician, and were attended with continual applauſe. Lulli every year, after this time, gave a piece of his own compoſition, till his death, which happened in 1687.

LULLY, Raymond, a writer on alchemy, ſurnamed the *Enlightened Doctor*, was born in the iſland of Majorca in 1225. He applied himſelf with indefatigable labour to the ſtudy of the Arabian philoſophy, to chemiſtry, phyſic, and divinity; and acquired great reputation by his works. He at length went to preach the goſpel in Africa; and was ſtoned to death in Mauritania, at the age of 80. He is honoured as a martyr at Majorca, whither his body was carried. He wrote many treatiſes on all the ſciences, in which he ſhows much ſtudy and ſubtility, but little judgement or ſolidity. A complete edition of his works has been printed at Mentz.—He ought not to be confounded with Raymond Lully of Terraca, ſurnamed *Neophyta*, who from being a Jew turned Dominican friar. This laſt Lully maintained ſeveral opinions that were condemned by Pope Gregory XI.

LUMBAGO, a fixed pain in the ſmall of the back. See Medicine *Index*.

LUMBARIS, a name given to the arteries and veins which ſpread over the loins.

LUMBRICAL, a name given to four muſcles of the fingers and to as many of the toes.

LUMBRICUS, the Worm, a genus of animals belonging to the order of vermes inteſtina. See Helminthology *Index*.

LUMELLO, a village in Italy, which gives name to the Lumellin, a ſmall diſtrict in the duchy of Milan, lying along the river Po, and of which Mortaria and Valencia are the principal places. It was ceded to the duke of Savoy in 1707, and confirmed by the treaty of Utrecht in 1713. E. Long. 8. 42. N. Lat. 45. 5.

LUMINOUS, an epithet applied to any thing that ſhines or emits light.

Luminous Emanations have been obſerved from human bodies, as alſo from thoſe of brutes. The light ariſing from currying a horſe, or from rubbing a cat's back, are known to moſt. Inſtances of a like kind have been known on combing a woman's head. Bartholin gives us an account, which he entitles *mulier ſplendens*, of a lady in Italy whoſe body would ſhine whenever ſlightly touched with a piece of linen. Theſe effluvia of animal bodies have many properties in common with thoſe produced from glaſs; ſuch as their being lucid, their ſnapping, and their not being excited without ſome degree of friction; and are undoubtedly electrical, as a cat's back has been found ſtrongly electrical when ſtroaked. See Electricity and Light.

LUMINOUSNESS of the Sea. See Light and Sea.

Luminousness of Putreſcent Subſtances. See Light.

LUMP-fish. See Cyclopterus, Ichthyology *Index*.

LUNA, in *Ancient Geography*, a foreſt of Germany, at no great diſtance from the Hercynian; below which were the Boemi: it was therefore in Moravia, near the ſprings of the Marus, now March, which runs into the Danube over againſt Carnutum.

Luna, or *Lunna*, a town of Gallia Celtica. Now *Clugny* in Burgundy.

Luna, a town and port of Liguria, at the mouth of the Macra. The town was but ſmall, but the port large and beautiful, according to Strabo. Now extinct, and its ruins called *Luna Diſtrutta*. It was famous for its quarries of white marble, thence called *Lunenſe*; and for its cheeſe, remarkable rather for its ſize than goodneſs, each being a thouſand weight.

Luna, in *Aſtronomy*, the moon. See Astronomy, *paſſim*.

Luna, in the jargon of the alchemiſts, ſignifies *ſilver*; ſo called from the ſuppoſed influence of the moon thereupon.

Luna Cornea, in *Chemiſtry*, is a compound of muriatic acid with ſilver. See Silver, muriate of, Chemistry *Index*.

LUNACY, a ſpecies of madneſs. See Lunatic, and Medicine *Index*.

Lunacy, in *Law*. See Idiocy and Lunatic.

LUNÆ mons, in *Ancient Geography*, a promontory of Luſitania. Now *Rock of Liſbon*. W. Long. 10. N. Lat. 38. 50.—Another *Lunæ Mons* of Ethiopia, from which the Nile was ſuppoſed to take its riſe.

Lunæ Portus, a very extenſive port, or more truly a bay, of Liguria, between Portus Veneris and Portus Ericis, 20 miles in compaſs. Now *il Golfo della Spezia*, on the eaſt coaſt of the territory of Genoa.

LUNAR, ſomething relating to the Moon.

Lunar Month. See Month.

Lunar Year, conſiſts of 354 days, or 12 ſynodical months. See Year.

Lunar Dial. See Dialling.

LUNARE os, in *Anatomy*, is the ſecond bone in the firſt row of the carpus. It has its name from the Latin, *luna*, "the moon," becauſe one of its ſides is in form of a creſcent.

LUNARIA, Satin-flower, or *Moonwort*; a genus of plants belonging to the tetradynamia claſs; and in the natural method ranking under the 39th order, *Siliquoſæ*. See Botany *Index*.

LUNARIUM, in *Ancient Geography*, a promontory of the Hither Spain, between Blanda and Bætulo. Commonly called *el Cabo de Palafugel*, in Catalonia, on the Mediterranean; or *Cabo de Toſa*, on the ſame coaſt, and in Catalonia, 15 miles from the former, to the weſt.

LUNATIC, a perſon affected with that ſpecies of madneſs termed *lunacy*. The word is indeed properly applied to one that hath lucid intervals; ſometimes enjoying his ſenſes, and ſometimes not; and that frequently ſuppoſed to depend on the influence of the moon.

Lunatic, in *Law*. Under the general term of *non compos mentis* (which Sir Edward Coke ſays is the moſt legal name), are compriſed not only lunatics, but perſons under frenzies, or who loſe their intellects by diſeaſe; thoſe that *grow* deaf, dumb, and blind, not being *born* ſo; or ſuch, in ſhort, as are judged by the court of chancery incapable of conducting their own affairs. To theſe alſo, as well as idiots, the king is guardian, but to a very different purpoſe. For the law always imagines, that theſe accidental misfortunes may be removed; and therefore only conſtitutes the crown a truſtee for the unfortunate perſons, to protect their property, and to account to them for all profits received, if they recover, or after their deceaſe to their repreſentatives. And therefore it is declared by the ſtatute 17 Edw. II. c. 10. that the king ſhall provide for the cuſtody and ſuſtentation of lunatics, and preſerve their lands, and the profits of them, for their uſe when they come to their right mind; and the king ſhall take nothing to his own uſe: and if the parties die in ſuch eſtate, the reſidue ſhall be diſtributed for their ſouls by the advice of the ordinary, and of courſe (by the ſubſequent amendments of the law of adminiſtrations) ſhall now go to their executors or adminiſtrators.

On the firſt attack of lunacy, or other occaſional inſanity, when there may be hopes of a ſpeedy reſtitution of reaſon, it is uſual to confine the unhappy objects in private cuſtody under the direction of their neareſt friends and relations; and the legiſlature, to prevent all abuſes incident to ſuch private cuſtody, hath thought proper to interpoſe its authority, by 14 Geo. III. c. 49. for regulating private mad-houſes. But when the diſorder is grown permanent, and the circumſtances of the party will bear ſuch additional expence, it is thought proper to apply to the royal authority to warrant a laſting confinement.

The method of proving a perſon *non compos* is very ſimilar to that of proving him an idiot. The lord chancellor, to whom, by ſpecial authority from the king, the cuſtody of idiots and lunatics is intruſted, upon petition or information, grants a commiſſion in nature of the writ *de idiota inquirendo*, to inquire into the party's ſtate of mind; and if he be found *non compos*, he uſually commits the care of his perſon, with a ſuitable allowance for his maintenance, to ſome friend, who is then called his committee. However, to prevent ſiniſter practices, the next heir is ſeldom permitted to be of this committee of the perſon; becauſe it is his intereſt that the party ſhould die. But it hath been ſaid there lies not the ſame objection againſt his next of kin, provided he be not his heir; for it is his intereſt to preſerve the lunatic's life, in order to increaſe the perſonal eſtate by ſavings, which he or his family may hereafter be entitled to enjoy. The heir is generally made the manager or committee of the eſtate, it being clearly his intereſt by good management to keep it in condition: accountable, however, to the court of chancery, and to the *non compos* himſelf, if he recovers; or otherwiſe, to his adminiſtrators. See IDIOCY.

LUNATION, the period or ſpace of time between one new moon and another; alſo called *ſynodical month*. See CYCLE and EPACT.

LUNDEN, or LUND, a conſiderable town of Sweden, in Gothland; and capital of the territory of Schonen, with an archbiſhop's ſee and an univerſity. It was ceded to the Swedes by the Danes in 1658. E. Long. 13. 25. N. Lat. 55. 40.

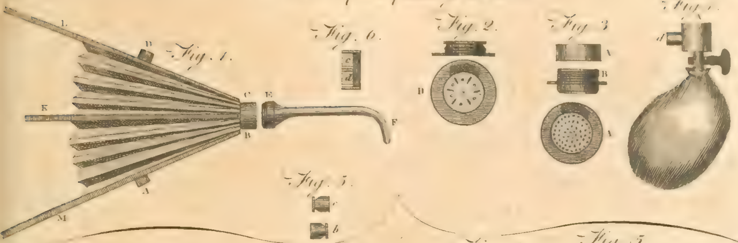
LUNDY ISLAND, ſituated 50 miles in the ſea, off the north-weſt coaſt of Devonſhire, is five miles long and two broad, but ſo encompaſſed with inacceſſible rocks, that it has but one entrance to it, ſo narrow that two men can ſcarcely go abreaſt. It is reckoned in the hundred of Brandon. It had once both a fort and a chapel. The ſouth part of it is indifferent good ſoil, but the north part of it is barren, and has a high pyramidal rock called the *Conſtable*. Here are horſes, kine, hogs, and goats, with great ſtore of ſheep and rabbits; but the chief commodity is fowl, with which it abounds much, their eggs being very thick on the ground at their ſeaſon of breeding. No venomous creature will live in this iſland. In the reign of Henry VIII. one William Moriſco, who had conſpired to murder him at Woodſtock, fled to this iſland, which he fortified, turned pirate, and did much damage to this coaſt; but was taken by ſurpriſe at length, with 16 of his accomplices, and put to death.

LUNE, LUNULA, in *Geometry*, a plane in form of a creſcent or half-moon, terminated by the circumference of two circles, that interſect each other within.

LUNENBURG, or LUNENBURG *Zell*, a principality of Germany, bounded to the ſouth by that of Calenberg, the dioceſe of Hildeſheim, and the duchy of Brunſwic; to the north, by the duchy of Lauenburg and the Elbe, by the laſt of which it is ſeparated from the territory of the imperial city of Hamburgh; to the eaſt, by the duchy of Brunſwic, the Alte Mark, and the duchy of Mecklenburg; and to the weſt, by the duchies of Bremen and Verden, the county of Hoya, and the principality of Calenberg. The ſoil, except along the Elbe, Aller, and Jetz, is either ſand, heath, or moor. In the more fruitful parts of it are produced wheat, rye, barley, oats, peaſe, buck-wheat, flax, hemp, hops, pulſe, oak, beech, firs, pines, birch, and alder, together with black cattle and horſes. The heaths abound with bees and honey, and a ſmall kind of ſheep whoſe wool is long and coarſe. Lunenburg is well furniſhed with ſalt ſprings and limeſtone, and the foreſt of Gorde with veniſon. The rivers Elbe, Ilmenau and Aller, are navigable; and conſequently very advantageous to the country, independent of the fiſh which they yield. The general diets of this principality are convened by the ſovereign twice a-year, and held at Zell. They conſiſt of the deputies of the nobility and the towns of Lunenburg, Uelzen, and Zell, who have the nomination of the members of the high colleges, and other officers, jointly with the ſovereign. There are near 200 Lutheran churches in the country, under two general and 15 ſubordinate ſuperintendants, ſeveral grammar-ſchools, two Calviniſt churches at Zell, and an academy of exerciſes at Lunenburg. The manufactures are chiefly linen cloth, cottons, ribbons, ſtockings, hats, ſtarch, bleached wax, refined ſugar, gold and ſilver wires, all kinds of wooden wares, barges, boats, and ſhips. The exports of theſe to Hamburgh, Lubec, and Altona, are conſiderable. The neighbourhood of theſe cities, with the facility of conveying goods and merchandiſe to them and other places, either by land or water, is very advantageous to this country, and contributes greatly to its ſubſiſtence. On account of this principality, the king of Great Britain has a ſeat and voice both in the college of the princes of the empire and of the circle of Lower Saxony. Its quota in the matricula is 20 horſe and 120 foot, or 720 florins in lieu of them. The revenues of the principality ariſe chiefly from the demeſnes, tolls on the Elbe, contributions, duties on cattle, beer, wine, brandy, and other commodities, which all together muſt be very conſiderable, ſome bailiwics alone yielding upwards of 20,000 rix-dollars.

LUNENBURG, the capital of the principality of the ſame name, is a pretty large town of Germany, on the river Elmen, or the Ilmenau, which is navigable from the town to the Elbe, at the diſtance of 13 miles. It is 27 miles from Hamburgh, 43 from Zell, 65 from

APPARATUS *for inflating the* LUNGS



Ancient Lyres

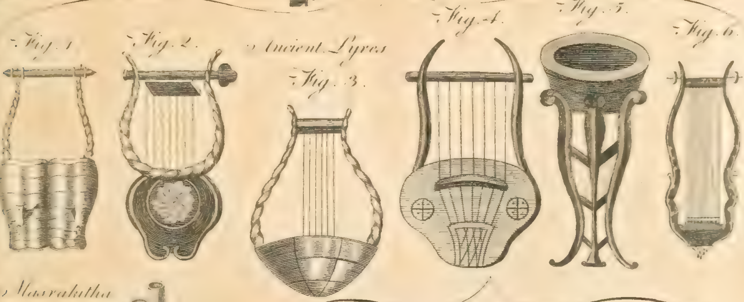

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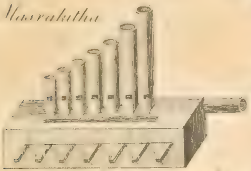
Fig. 6.

Masrakitha



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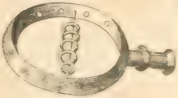

Magic Square of Squares

200	217	232	249	8	25	40	57	72	89	104	121	136	153	168	185
58	39	26	7	250	231	218	199	186	167	154	135	122	103	90	71
198	219	230	251	6	27	38	59	70	91	102	123	134	155	166	187
60	37	28	5	252	229	220	197	188	165	156	133	124	101	92	69
201	216	233	248	9	24	41	56	73	88	105	120	137	152	169	184
55	42	23	10	247	234	215	202	183	170	151	138	119	106	87	74
203	214	235	246	11	22	43	54	75	86	107	118	139	150	171	182
53	44	21	12	245	236	213	204	181	172	149	140	117	108	85	76
205	212	237	244	13	20	45	52	77	84	109	116	141	148	173	180
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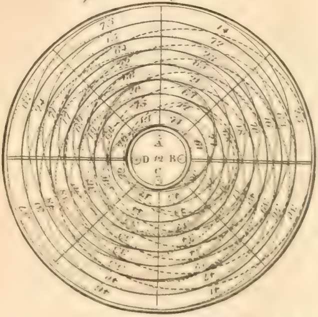
196	221	228	253	4	29	36	61	68	93	100	125	132	157	164	189
62	35	30	3	254	227	222	195	190	163	158	131	126	99	94	67
194	223	226	255	2	31	34	63	66	95	98	127	130	159	162	191
64	33	32	1	256	225	224	193	192	161	160	129	128	97	96	65

Magic Circle of Circles



Lunenburg. Lunense Marmor.

Brunſwic, 76 from Bremen, 68 from Hanover; and ſtands in E. Long. 10. 40. N. Lat. 53. 28. Its inhabitants are reckoned at between 8000 and 9000. Formerly this town was one of the Hanſe, and an imperial city. Some derive its name from *Lina*, the ancient name of the Ilmenau; others from *Luna*, the moon, an image of which is ſaid to have been worſhipped by the inhabitants in the times of Paganiſm. Here were anciently ſeveral convents, viz. one of Minims, another of Premonſtratenſians, another of Benedictines, and a fourth of Minorites. Out of the revenues of the Benedictine monaſtery was founded an academy for the martial exerciſes, where young gentlemen of the principality of Lunenburg are maintained gratis, and taught French, fencing, riding, and dancing; but foreigners are educated at a certain fixed price. A Latin ſchool was alſo founded, conſiſting of four claſſes, and well endowed out of theſe revenues. The ſuperintendancy and management of theſe, and the eſtates appropriated to their maintenance, belongs to the landſchaft director, and the aufreiter, who are both choſen from among the Lunenburg nobility. The firſt came in place of the Popiſh abbot, and as ſuch is head of the ſtates of the principality, and preſident of the provincial college. He has the title of *excellency*; and in public inſtruments ſtyles himſelf, *by the grace of God landſchaft director*, and *lord of the manſion of St Michael in Lunenburg*. The chief public edifices are three pariſh-churches, the ducal palace, three hoſpitals, the town-houſe, the ſalt-magazine, the anatomical theatre, the academy; the conventual church of St Michael, in which lie interred the ancient dukes, and in which is the famous table eight feet long, and four wide, plated over with chaſed gold, with a rim embelliſhed with precious ſtones, of an immenſe value, which was taken from the Saracens by the emperor Otho, and preſented to this church: but in 1698, a gang of thieves ſtripped it of 200 rubies and emeralds, together with a large diamond, and moſt of the gold, ſo that at preſent but a ſmall part of it remains. Here are ſome very rich ſalt ſprings. Formerly, when there was a greater demand for the ſalt, upwards of 120,000 tons have been annually boiled here, and ſold off; but ſince the commencement of the preſent century, the ſalt trade hath declined greatly. A fifth of the ſalt made here belongs to the king, but is farmed out. It is ſaid to excel all the other ſalt made in Germany. This town is well fortified; and has a garriſon, which is lodged in barracks. In the neighbourhood is a good limeſtone quarry; and along the Ilmenau are warehouſes, in which are lodged goods brought from all parts of Germany, to be forwarded by the Ilmenau to Hamburgh, or by the Aſche to Lubec, from whence other goods are brought back the ſame way. The town itſelf carries on a conſiderable traffic in wax, honey, wool, flax, linen, ſalt, lime, and beer.

LUNENSE MARMOR, in the natural hiſtory of the ancients, the name of that ſpecies of white marble now known among us by the name of the *Carrara marble*, and diſtinguiſhed from the ſtatuary kind by its greater hardneſs and leſs ſplendour. It was ever greatly eſteemed in building and ornamental works, and is ſo ſtill. It is of a very cloſe and fine texture, of a very pure white, and much more tranſparent than any other of the white marbles. It has always been found in great quantities in Italy, and is ſo to this day. See LUNA.

Lunette, Lungs.

LUNETTE, in *Fortification*, an enveloped counterguard, or elevation of earth, made beyond the ſecond ditch, oppoſite to the places of arms; differing from the ravelins only in their ſituation. *Lunettes* are uſually made in ditches full of water, and ſerve to the ſame purpoſe as fauſſebrayes, to diſpute the paſſage of the ditch. See FORTIFICATION.

LUNETTE, in the manege, is a half horſe-ſhoe, or ſuch a ſhoe as wants the ſponge, i. e. that part of the branch which runs towards the quarters of the foot.

LUNETTE is alſo the name of two ſmall pieces of felt, made round and hollow, to clap upon the eyes of a vicious horſe that is apt to bite, and ſtrike with his fore feet, or that will not ſuffer his rider to mount him.

LUNGS, in *Anatomy*, a part of the human body, ſerving for reſpiration. See ANATOMY, N° 117.

In the *Journal de Medicine* for June 1789 is a deſcription of an

Inſtrument for Inflating the LUNGS, invented by M. Gorcy, phyſician to the military hoſpital at Neufbriſack, which appears to be extremely well adapted to the purpoſe, whilſt it may be uſed with the greateſt eaſe and facility.

This inſtrument, which the inventor ſtyles *apodopic*, that is, "reſtorer of reſpiration," conſiſts of a double pair of bellows, BCLM, fig. 1. the two different parts of which have no communication with each other. In the lower ſide BM, is an aperture A for a valve conſtructed on the principles of thoſe of Mr Nairne's air-pump. It conſiſts of a rim of copper, cloſed at one end by a plate of the ſame metal, in which plate are ſeven ſmall holes placed at equal diſtances. This plate is covered with pieces of ſilk coated with elaſtic gum, in which are ſix tranſverſe inciſions of two or three lines in length. Each inciſion is ſo made as to be ſituated between two of the holes, and at an equal diſtance from each: *ſee* D, fig. 2. The ſilk muſt be made very ſecure, by a thread paſſing ſeveral times round the rim. It is obvious, that a ſtream of air applied to that ſide of the plate which is oppoſite the ſilk, will paſs through the holes, and, lifting up the ſilk, eſcape through the inciſions. On the contrary, a ſtream of air applied to the other ſide will preſs the ſilk upon the plate, and thus cloſe the holes, ſo that it will be impoſſible for it to paſs through them. This valve opens internally, ſo as to admit the air from without. At B is another valve, on the ſame conſtruction, but opening in a contrary direction, thus permitting the air to eſcape out of the lower part into the tube EF, but preventing its entrance. At C is another valve, opening internally to admit the air from the tube EF; and at D there is a fourth, opening externally to diſcharge the air from the upper part.

Plate CCXCVIII.

The flexible tube EF, ſcrewed on at the end CB, being introduced into one of the noſtrils, whilſt the mouth and the other noſtril are cloſed by an aſſiſtant, if we ſeparate the two handles LM, which were cloſe together at the introduction of the tube, it is evident, that the air in the lungs will ruſh into the upper part through the valve C, whilſt the external air will fill the lower part through the valve A: the two handles being again brought into contact, the atmoſpheric air will be forced into the lungs through the valve B, and at the ſame time the air in the upper part will be diſcharged at the valve D. Thus by the alternate play of the double bellows, the lungs will be alternately filled and emptied as in reſpiration. In uſing the inſtrument care ſhould be taken not to be too violent; as the more perfectly the natural motion of reſpiration is imitated, the better.

To prevent any ſubſtances from without injuring the valves AD, fig. 1. the rim is made with a ſcrew, B, fig. 3. in order to receive a cap AA, fig. 3. full of ſmall holes. This ſcrew has alſo another uſe. If air or oxygen gas be preferred, a bladder filled with it, fig. 4. may, by means of the ſcrew A, be faſtened to the valve A, fig. 1.; and, to prevent waſte, as this air may ſerve ſeveral times, a flexible tube may be ſcrewed on the valve D, fig. 1. communicating with the bladder by means of the opening *d*, fig. 4.: thus it may be employed as often as the operator thinks proper.

There is a handle K to the partition in the middle, in order that, if it be at any time neceſſary to uſe either of the diviſions alone, the other may be confined from acting. *c*, *b*, fig. 5. repreſent the two valves to be applied at the end of the inſtrument C, B, fig. 1.; and fig. 6. is a ſection of the end CB, ſhowing the valves in their proper places.

It is proper to add, that the capacity of the inſtrument ſhould be proportioned to the quantity of air received into the lungs in inſpiration, which Dr Goodwyn has aſcertained to be twelve cubical inches or ſomewhat more. Each diviſion of the inſtrument, therefore, ſhould be capable of containing that quantity.

Lung-Wort. See Pulmonaria, Botany *Index*.

LUNISOLAR year, in *Chronology*, the ſpace of 532 common years; found by multiplying the cycle of the ſun by that of the moon.

LUNULA. See Lune.

LUPERCALIA, feaſts inſtituted in ancient Rome, in honour of the god Pan. The word comes from *Lupercal*, the name of a place under the Palatine mountain, where the ſacrifices were performed.

The Lupercalia were celebrated on the 15th of the kalends of March, that is, on the 15th of February, or, as Ovid obſerves, on the third day after the ides. They are ſuppoſed to have been eſtabliſhed by Evander.

On the morning of this feaſt, the Luperci, or prieſts of Pan, ran naked through the ſtreets of Rome, ſtriking the married women they met on the hands and belly with a thong or ſtrap of goats leather, which was held an omen promiſing them fecundity and happy deliveries. See Luperci.

This feaſt was aboliſhed in the time of Auguſtus; but afterwards reſtored, and continued to the time of the emperor Anaſtaſius.—Baronius ſays it was aboliſhed by the pope in 496.

LUPERCI, a name given to the prieſts of the god Pan. See Lupercalia.

The *luperci* were the moſt ancient order of prieſts in Rome; they were divided into two colleges or companies, the one called *Fabii* and the other *Quintilii*. To theſe Cæſar added a third, which he called *Julii*.

LUPINUS, lupine; a genus of plants belonging to the diadelphia claſs; and in the natural method ranking under the 32d order, *Papilionaceæ*. See Botany *Index*.

LUPULUS, the hop plant. See Humulus, Botany *Index*.

LUPUS, the wolf. See Canis, Mammalia *Index*.

Lupus-Marinus, the *Sea-wolf*, a fiſh. See Anarrhicas, Ichthyology *Index*.

Lupus, in *Aſtronomy*. See Astronomy *Index*.

LURCHER, a kind of hunting-dog, much like a mongrel greyhound with pricked years, a ſhagged coat, and generally of a yellowiſh white colour: they are very ſwift runners, ſo that if they get between the burrows and the conies they ſeldom miſs; and this is their common practice in hunting: yet they uſe other ſubtilties, as the tumbler does, ſome of them bringing in their game, and thoſe are the beſt. It is alſo obſervable, that a lurcher will run down a hare at ſtretch.

LURE, in falconry, a device of leather, in the ſhape of two wings, ſtuck with feathers, and baited with a piece of fleſh, to call back a hawk when at conſiderable diſtance.

LURGAN, a town in the county of Armagh and province of Ulſter in Ireland, 67 miles from Dublin. It is a flouriſhing town, agreeably ſituated in the midſt of a much improved country; and the inhabitants are extenſively engaged in the linen manufacture. It ſtands on a gentle eminence, about two miles from Lough-Neagh, of which it commands a moſt beautiful and extenſive proſpect. N. Lat. 54. 35. W. Long. 6. 31.

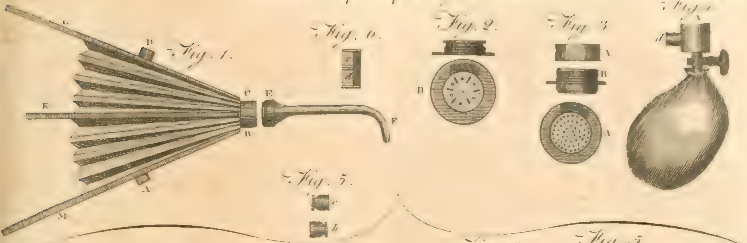
Lurgan-green, a town of Ireland, in the county of Louth and province of Leinſter, 37 miles from Dublin; a mile beyond which is a handſome ſeat of the earl of Charlemont.

LURIDÆ, the name of the 28th order in Linnæus's fragments of a natural method. See Botany, Natural Orders.

LUSATIA, a marquiſate of Germany, in Upper Saxony; bounded to the eaſt by Sileſia, to the weſt by Miſnia, to the ſouth by Bohemia, and to the north by the marquiſate of Brandenburgh. Till towards the middle of the 15th century, the Upper Luſatia was called the *Mark*, i. e. *the marquiſate or the land of Budiſzin and Gorlitz;* and the Lower only *Luſatia*, which it is ſaid, in the Sclavonic, ſignifies "a woody or marſhy country." The air of the Upper Luſatia, which is hilly or mountainous, is better than that of the Lower, a great part of which is mooriſh and boggy. Both abound in wood, eſpecially the Lower, and turf for fuel. The heathy and mountainous tracts are generally barren; but the lower champaign and marſh lands are tolerably fertile, producing paſture, wheat, rye, oats, barley, buck-wheat, peaſe, lentils, beans, and millet; together with flax, hops, tobacco, ſome white and red wine, and what is called *manna*. Of ſeveral of theſe articles, however, conſiderable quantities are imported. In this country are found alſo quarries of ſtone, medicinal ſprings, baſtard diamonds, agates, and jaſpers, earths and clays for tobacco-pipes and all ſorts of earthen ware, alum, good iron ſtone, vitriolic and copper water; nor is it deſtitute of cattle, fiſh, and veniſon. The rivers Spree, the Schwarze or Black Elſter, and the Pulznitz, have their

APPARATUS for inflating the LUNGS

Plate CCXCVIII.



Ancient Lyres

Fig. 1.

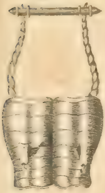


Fig. 2.

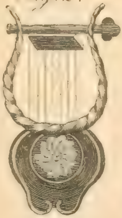


Fig. 3.

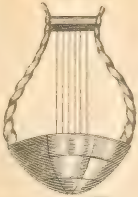


Fig. 4.

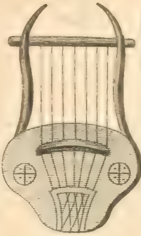
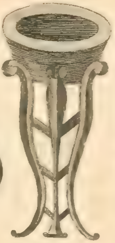


Fig. 5.



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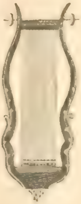
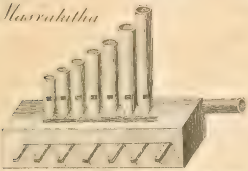


Mashrokitha



Machul

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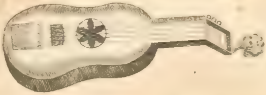

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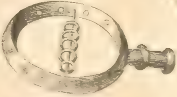

Magic Square of Squares

200	217	232	249	8	25	40	57	72	89	104	121	136	153	168	185
58	39	26	7	250	231	218	199	186	167	154	135	122	103	90	71
198	219	230	251	6	27	38	59	70	91	102	123	134	155	166	187
60	37	28	5	252	229	220	197	188	165	156	133	124	101	92	69
201	216	233	248	9	24	41	56	73	88	105	120	137	152	169	184
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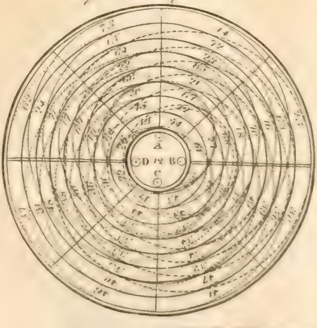
Magic Circle of Circles



J. Bell Prim. Hall [illegible]

Luſatia. their ſources in the Luſatias, which are alſo watered by the Neiſſe and Quis. The ancient inhabitants of this country were the Saxons, who were ſucceeded by the Vandals, and theſe by the Sorbian Wends, a Sclavonian people. The preſent inhabitants, the deſcendants of the Wends, have an odd dreſs; and their language is ſo inarticulate and guttural, that it hath been ſaid, it might be pronounced without lips, teeth, or tongue; but the towns are almoſt wholly peopled by Germans.

In the Upper Luſatia are ſix towns which appear at the land-diets, 16 ſmaller country towns, and four market towns. In the Lower are four diet towns, 13 country towns, and two market ones. Both marquiſates were formerly ſubject either to the kings of Bohemia, the archdukes of Auſtria, or electors of Brandenburgh: but, in 1636, both were abſolutely ceded to the elector of Saxony, in lieu of the 72 tons of gold which he expended in aſſiſting the emperor Ferdinand II. againſt the Bohemians.

Chriſtianity was firſt planted in Luſatia in the ſeventh century; but it was ſeveral centuries after that before Popery was fully eſtabliſhed. In the 11th century many cloiſters were erected in the country; but at the Reformation ſuch numbers embraced Lutheraniſm, that it became the predominant religion, and ſtill continues, though there are ſtill ſeveral Roman Catholic foundations, churches, market-towns, and villages. The enthuſiaſtic ſect of Hernhuters poſſeſſes a great influence and eſteem here. There are conſiderable manufactures of woollen and linen ſtuffs in the Luſatias, eſpecially the Upper. At Budiſſen, and in the adjacent country, prodigious quantities of ſtockings, ſpatterdaſhes, caps, and gloves are made. The linen manufactures alſo flouriſh here, chiefly in the Upper Luſatia, where all ſorts of linen are made, printed, and dyed. Excluſive of theſe, there are conſiderable manufactures of hats, leather, paper, gunpowder, iron, glaſs, bleached wax, &c. Though the demand and exportation of theſe commodities, particularly linens and woollens, is not ſo great as formerly, yet it is ſtill conſiderable, and more than overbalances their importations in wool, yarn, ſilk, wines, ſpices, corn, freſh and baked fruits, garden ſtuff, and hops. Diſputes of many years ſtanding have ſubſiſted between the country artificers and linen manufacturers on the one ſide, and the diet towns on the other; the latter unjuſtly ſeeking to exclude the former from any ſhare in the linen trade. The natives of this country are ſaid to have quick natural parts, but to be ſordidly penurious. We are told they obſerve the Saxon laws much better than they did the Bohemian. Learning hath been much eſteemed and encouraged in both marquiſates ſince the Reformation. The ſchools in the ſix diet towns of Upper Luſatia, particularly at Gorlitz, Budiſſen, and Zittau, greatly diſtinguiſh themſelves, having handſome ſtipends. In Lower Luſatia alſo are ſome good ſchools, with ſtipends for the maintenance of ſtudents. Printing is ſaid to be much followed, and brought to great perfection in this country.

In Upper Luſatia, the ſtates conſiſt, 1ſt, of thoſe called *ſtate-lords*; 2dly, of the prelates; 3dly, of the gentry and commonalty, under which are comprehended the counts, [illegible], and [illegible], poſſeſſors of [illegible]; and, 4thly, of the repreſentatives of the ſix principal towns. Without the conſent of theſe ſtates [illegible] thing of importance, that regards the [illegible]. The diets are ordinary or extraordinary. The ordinary meet once in three years, and the extraordinary when ſummoned [illegible] emergencies. As to eccleſiaſtical matters, the dean of Budiſſen and his conſiſtory exerciſe all manner of epiſcopal juriſdiction; and among the Proteſtants, the juriſdiction belongs either to the ſuperior, the upper-office, or the patrons. The revenues ariſing to the ſuperior or ſovereign, from Upper Luſatia, conſiſt partly of the ſubſidies granted by the ſtates, among which, at preſent, are reckoned capitation and eſtate-money; and partly of the beer-tax, exciſe, tolls, &c. —Upper Luſatia is divided into two great circles, viz. thoſe of Budiſſen and Gorlitz, which are again divided into leſſer circles.

The land ſtates of Lower Luſatia conſiſt, like thoſe of the Upper, of prelates, lords, and knights, and the repreſentatives of the ſtate towns, which are Luckau, Gubben-Lubben, and Kalau. Two land diets are yearly held at Lubben, called *voluntary-diets*; but when the ſuperior cauſes the ſtates to be ſummoned together at his diſcretion, and propoſitions to be laid before them, by commiſſaries deputed for that purpoſe, ſuch convention is called a *great land diet*. The marquiſate is divided into five circles, each of which holds a circle aſſembly in its circle town. The chief officers appointed either by the ſuperior or the ſtates are, the preſident of the upper office, the land captain, and the land judge. The principal tribunals are, the land court, and the upper office, to which lie appeals from the inferior judicatories. There are alſo officers for the ſeveral circles. Spiritual matters belong here to a conſiſtory, erected in 1668. The ordinary taxes are paid into the cheſt of the circle; and from thence conſigned to the general cheſt, of which the upper tax-receiver is ſuperintendant. By him an annual account of the receipts is made out, which is examined and paſſed by the deputies of the ſtates.

LUSITANIA, in *Ancient Geography*, one of the diviſions of Spain, extending to the north of the Tagus, quite to the ſea of Cantabria, at leaſt to the Promontorium Celticum. But Auguſtus, by a new regulation, made the Anas its boundary to the ſouth, the Durius to the north; and thus conſtituting only a part of the modern Portugal. *Luſitani* the people, (Diodorus, Stephanus).

LUSTRAL, an epithet given by the ancients to the water uſed in their ceremonies to ſprinkle and purify the people. From them the Romaniſts have borrowed the holy water uſed in their churches.

Lustral Day (*Dies Luſtricus*), that whereon the luſtrations were performed for a child, and its name given; which was uſually the ninth day from the birth of a boy, and the eighth from that of girl. Though others performed the ceremony on the laſt day of that week wherein the child was born, and others on the fifth day from its birth.

Over this feaſt-day the goddeſs Nundina was ſuppoſed to preſide; the midwives, nurſes, and domeſtics handed the child backwards and forwards, around a fire burning on the altars of the gods, after which they ſprinkled it with water; hence this feaſt had the name of *amphidromia*. The old women mixed ſaliva and duſt with the water. The whole ended with a ſumptuous entertainment. The parents received gifts from their friends on this occaſion. If the child was a male, their door was decorated with an olive garland; if a female, with wool, denoting the work about which women were to be employed.

LUSTRATION, in *Antiquity*, ſacrifices or ceremonies by which the ancients purified their cities, fields, armies, or people, defiled by any crime or impurity. Some of theſe luſtrations were public, others private. There were three ſpecies or manners of performing luſtration, viz. by fire and ſulphur, by water, and by air; which laſt was done by fanning and agitating the air round the thing to be purified. Some of theſe luſtrations were neceſſary, i. e. could not be diſpenſed with; as luſtrations of houſes in time of a plague, or upon the death of any perſon: others again were done out of choice, and at pleaſure. The public luſtrations at Rome were celebrated every fifth year; in which they led a victim thrice round the place to be purified, and in the mean time burnt a great quantity of perfumes. Their country luſtrations, which they called *ambarvalia*, were celebrated before they began to reap their corn: in thoſe of the armies, which they called *armiluſtria*, ſome choſen ſoldiers, crowned with laurel, led the victims, which were a cow, a ſheep, and a bull, thrice round the army ranged in battle-array in the field of Mars, to which deity the victims were afterwards ſacrificed, after pouring out many imprecations upon the enemies of the Romans. The luſtrations of their flocks were performed in this manner: the ſhepherd ſprinkled them with pure water, and thrice ſurrounded his ſheepfold with a compoſition of ſavin, laurel, and brimſtone ſet on fire; and afterwards ſacrificed to the goddeſs Pales an offering of milk boiled, wine, a cake, and millet. As for private houſes, they were luſtrated with water, a fumigation of laurel, juniper, olive tree, ſavin, and ſuch like; and the victim commonly was a pig. Luſtrations made for particular perſons were commonly called *expiations*, and the victims *piacula*. There was alſo a kind of luſtration uſed for infants, by which they were purified, girls the third, and boys the ninth, day after their birth; which ceremony was performed with pure water and ſpittle. See the article AMBARVALIA.—In their luſtratory ſacrifices, the Athenians ſacrificed two men, one for the men of their city, and the other for the women. Divers of theſe expiations were auſtere: ſome faſted; others abſtained from all ſenſual pleaſures; and ſome, as the prieſts of Cybele, caſtrated themſelves. The poſtures of the penitents were different according to the different ſacrifices. The prieſts changed their habits according to the ceremony to be performed; white, purple, and black, were the moſt uſual colours. They caſt into the river, or at leaſt out of the city, the animals or other things that had ſerved for a luſtration or ſacrifice of atonement; and thought themſelves threatened with ſome great misfortune when by chance they trod upon them. Part of theſe ceremonies were aboliſhed by the emperor Conſtantine and his ſucceſſors: the reſt ſubſiſted till the Gothic kings were maſters of Rome; under whom they expired, excepting what the popes thought proper to adopt and bring into the church.

For the luſtration, or rather expiation, of the ancient Jews, ſee EXPIATION.

LUSTRE, the gloſs or brightneſs appearing on any thing, particularly on manufactures of ſilk, wool, or ſtuff. It is likewiſe uſed to denote the compoſition or manner of giving that gloſs.

The luſtre of ſilks is given them by waſhing in ſoap, then clear water, and dipping them in alum water cold. To give ſtuffs a beautiful luſtre: For every eight pounds of ſtuff allow a quarter of a pound of linſeed; boil it half an hour, and then ſtrain it through a cloth, and let it ſtand till it is turned almoſt to a jelly: afterwards put an ounce and a half of gum to diſſolve 24 hours; then mix the liquor, and put the cloth into this mixture; take it out, dry it in the ſhade, and preſs it. If once doing is not ſufficient, repeat the operation. Curriers give a luſtre to black leather firſt with juice of barberries, then with gum-arabic, ale, vinegar, and Flanders glue, boiled together. For coloured leather, they uſe the white of an egg beaten in water. Moroccoes have their luſtre from juice of barberries, and lemon or orange. For hats, the luſtre is frequently given with common water: ſometimes a little black dye is added: the ſame luſtre ſerves for furs, except that for very black furs they ſometimes prepare a luſtre of galls, copperas, Roman alum, ox's marrow, and other ingredients.

LUSTRE, an appellation given to a branched candleſtick, when made of glaſs. See BRANCH and JESSE.

LUSTRINGS. A company was incorporated for making, dreſſing, and luſtrating alamodes and luſtrings in England, who were to have the ſole benefit thereof, by ſtat. 4 and 5 William and Mary. And no foreign ſilks known by the name of *luſtrings* or alamodes are to be imported but at the port of London, &c. Stat. 9 and 10 William III. c. 43. See SILK.

LUSTRUM, in Roman antiquity, a general muſter and review of all the citizens and their goods, which was performed by the cenſors every fifth year, who afterwards made a ſolemn luſtration. See the article LUSTRATION.

This cuſtom was firſt inſtituted by Servius Tullius, about 180 years after the foundation of Rome. In courſe of time the luſtra were not celebrated ſo often; for we find the fifth luſtrum celebrated at Rome only in the 574th year of that city.

LUTE, or LUTING, among chemiſts, a mixed, tenacious, ductile ſubſtance, which grows ſolid by drying, and, being applied to the juncture of veſſels, ſtops them up ſo as to prevent the air from getting either in or out.

LUTE, is alſo a muſical inſtrument with ſtrings.—The lute conſiſts of four parts, viz. the table, the body or belly, which has nine or ten ſides: the neck, which has nine or ten ſtops or diviſions, marked with ſtrings: and the head or croſs, where the ſcrews for raiſing and lowering the ſtrings to a proper pitch of tone are fixed. In the middle of the table there is a roſe or paſſage for the ſound; there is alſo a bridge that the ſtrings are faſtened to, and a piece of ivory between the head and the neck to which the other extremities of the ſtrings are fitted. In playing, the ſtrings are ſtruck with the right hand, and with the left the ſtops are preſſed. The lutes of Bologna are eſteemed the beſt on account of the wood, which is ſaid to have an uncommon diſpoſition for producing a ſweet ſound.

LUTETIA PARISIORUM, in *Ancient Geography*, a town of the Pariſii, in Gallia Celtica, ſituated in an iſland in the Sequana or Seine. It received its name, as ſome ſuppoſe, from the quantity of clay, *lutum*, which is in its neighbourhood. J. Cæſar fortified and embelliſhed it, from which circumſtance ſome authors call it *Julii Civitas*. Julian the apoſtate reſided there for ſome time. It is now *Paris*, the capital of France; ſo called from its name *Paryis* in the lower age.

LUTHER, MARTIN, the celebrated author of the Reformation, was a native of Eiſleben in Saxony, and born in 1483. Though his parents were poor, he received a learned education; during the progreſs of which, he gave many indications of uncommon vigour and acuteneſs of genius. As his mind was naturally ſuſceptible of ſerious impreſſions, and tinctured with ſomewhat of that religious melancholy which delights in the ſolitude and devotion of a monaſtic life, he retired into a convent of Auguſtinian friars; where he acquired great reputation, not only for piety, but for love of knowledge and unwearied application to ſtudy. The cauſe of this retirement is ſaid to have been, that he was once ſtruck by lightning, and his companion killed by his ſide by the ſame flaſh. He had been taught the ſcholaſtic philoſophy which was in vogue in thoſe days, and made conſiderable progreſs in it: but happening to find a copy of the Bible which lay neglected in the library of his monaſtery, he applied himſelf to the ſtudy of it with ſuch eagerneſs and aſſiduity, as quite aſtoniſhed the monks; and increaſed his reputation for ſanctity ſo much, that he was choſen profeſſor firſt of philoſophy, and afterwards of theology, at Wittemberg on the Elbe, where Frederic elector of Saxony had founded an univerſity.

While Luther continued to enjoy the higheſt reputation for ſanctity and learning, Tetzel, a Dominican friar, came to Wittemberg in order to publiſh indulgences. Luther beheld his ſucceſs with great concern; and having firſt inveighed againſt indulgences from the pulpit, he afterwards publiſhed 95 theſes, containing his ſentiments on that ſubject. Theſe he propoſed, not as points fully eſtabliſhed, but as ſubjects of inquiry and diſputation. He appointed a day on which the learned were invited to impugn them either in perſon or by writing; and to the whole he ſubjoined ſolemn proteſtations of his high reſpect for the apoſtolic ſee, and of his implicit ſubmiſſion to its authority. No opponent appeared at the time prefixed; the theſes ſpread over Germany with aſtoniſhing rapidity, and were read with the greateſt eagerneſs.

Though Luther met with no oppoſition for ſome little time after he began to publiſh his new doctrines, it was not long before many zealous champions aroſe to defend thoſe opinions with which the wealth and power of the clergy were ſo ſtrictly connected. Their cauſe, however, was by no means promoted by theſe endeavours; the people began to call in queſtion even the authority of the canon law and of the pope himſelf.—The court of Rome at firſt deſpiſed theſe new doctrines and diſputes; but at laſt the attention of the pope being raiſed by the great ſucceſs of the reformer, and the complaints of his adverſaries, Luther was ſummoned in the month of July 1518, to appear at Rome, within 60 days, before the auditor of the chamber. One of Luther's adverſaries, named Prierias, who had written againſt him, was appointed to examine his doctrines, and to decide concerning them. The pope wrote at the ſame time to the elector of Saxony, beſeeching him not to protect a man whoſe heretical and profane tenets were ſo ſhocking to pious ears; and enjoined the provincial of the Auguſtinians to check by his authority the raſhneſs of an arrogant monk, which brought diſgrace upon their order, and gave offence and diſturbance to the whole church.

From theſe letters, and the appointment of his open enemy Prierias to be his judge, Luther eaſily ſaw what ſentence he might expect at Rome; and therefore diſcovered the utmoſt ſolicitude to have his cauſe tried in Germany, and before a leſs ſuſpected tribunal. He wrote a ſubmiſſive letter to the pope, in which he promiſed an unreſerved obedience to his will, for as yet he entertained no doubt of the divine original of the pope's authority; and by the interceſſion of the other profeſſors, Cajetan the pope's legate in Germany was appointed to hear and determine the cauſe. Luther appeared before him without heſitation: but Cajetan thought it below his dignity to diſpute the point with a perſon ſo much his inferior in rank; and therefore required him by virtue of the apoſtolic powers with which he was clothed, to retract the errors which he had uttered with regard to indulgences and the nature of faith, and to abſtain for the future from the publication of new and dangerous opinions; and at the laſt forbade him to appear in his preſence, unleſs he propoſed to comply with what had been required of him.

This haughty and violent manner of proceeding, together with ſome other circumſtances, gave Luther's friends ſuch ſtrong reaſons to ſuſpect that even the imperial ſafe-conduct would not be able to protect him from the legate's power and reſentment, that they prevailed on him ſecretly to withdraw from Augſburg, where he had attended the legate, and to return to his own country. But before his departure, according to a form of which there had been ſome examples, he prepared a ſolemn appeal from the pope, ill-informed at that time concerning his cauſe, to the pope, when he ſhould receive more full intimation with reſpect to it.—Cajetan, enraged at Luther's abrupt retreat, and at the publication of his appeal, wrote to the elector of Saxony, complaining of both; and requiring him, as he regarded the peace of the church, or the authority of its head, either to ſend that ſeditious monk a priſoner to Rome, or to baniſh him out of his territories. Frederic had hitherto, from political motives, protected Luther, as thinking he might be of uſe in checking the enormous power of the ſee of Rome; and though all Germany reſounded with his fame, the elector had never yet admitted him into his preſence. But upon this demand made by the cardinal, it became neceſſary to throw off ſomewhat of his former reſerve. He had been at great expence and beſtowed much attention on founding a new univerſity, an object of conſiderable importance to every German prince; and foreſeeing how fatal a blow the removal of Luther would be to its reputation, he not only declined complying with either of the pope's requests, but openly diſcovered great concern for Luther's ſafety.

The ſituation of our reformer, in the mean time, became daily more and more alarming. He knew very well what were the motives which induced the elector to afford him protection, and that he could by no means depend on a continuance of his friendſhip. If he ſhould be obliged to quit Saxony, he had no other aſylum, and muſt ſtand expoſed to whatever puniſhment the rage or bigotry of his enemies could inflict: and ſo ready were his adverſaries to condemn him, that he had been declared a heretic at Rome before the expiration of the 60 days allowed him in the citation for making his appearance. Notwithſtanding all this, however, he diſcovered no ſymptoms of timidity or remiſſneſs; but continued to vindicate his own conduct and opinions, and to inveigh againſt thoſe of his adverſaries with more vehemence than ever. Being convinced, therefore, that the pope would ſoon proceed to the moſt violent meaſures againſt him, he appealed to a general council, which he affirmed to be the repreſentative of the Catholic church, and ſuperior in power to the pope, who being a fallible man, might err, as St Peter, the moſt perfect of his predeceſſors, had done.

The court of Rome were equally aſſiduous in the mean time to cruſh the author of theſe new doctrines which gave them ſo much uneaſineſs. A bull was iſſued by the pope, of a date prior to Luther's appeal, in which he magnified the virtues of indulgences, and ſubjected to the heavieſt eccleſiaſtical cenſures all who preſumed to teach a contrary doctrine. Such a clear deciſion of the ſovereign pontiff againſt him might have been very fatal to Luther's cauſe, had not the death of the emperor Maximilian, which happened on January 17. 1519, contributed to give matters a different turn. Both the principles and intereſt of Maximilian had prompted him to ſupport the authority of the ſee of Rome: but, in conſequence of his death, the vicariate of that part of Germany which is governed by the Saxon laws devolved to the elector of Saxony; and, under the ſhelter of his friendly adminiſtration, Luther himſelf enjoyed tranquillity; and his opinions took ſuch root in different places, that they could never afterwards be eradicated. At the ſame time, as the election of an emperor was a point more intereſting to the pope (Leo X.) than a theological controverſy which he did not underſtand, and of which he could not foreſee the conſequences, he was ſo extremely ſolicitous not to irritate a prince of ſuch conſiderable influence in the electoral college as Frederick, that he diſcovered a great unwillingneſs to pronounce the ſentence of excommunication againſt Luther, which his adverſaries continually demanded with the moſt clamorous importunity.

From the reaſon juſt now given, and Leo's natural averſion to ſevere meaſures, a ſuſpenſion of proceeding againſt Luther took place for 18 months, though perpetual negociations were carried on during this interval in order to bring the matter to an amicable iſſue. The manner in which theſe were conducted having given our reformer many opportunities of obſerving the corruption of the court of Rome, its obſtinacy in adhering to eſtabliſhed errors, and its indifference about truth, however clearly propoſed or ſtrongly proved, he began, in 1520, to utter ſome doubts with regard to the divine original of the papal authority, which he publicly diſputed with Eccius, one of his moſt learned and formidable antagoniſts. The diſpute was indeciſive, both parties claiming the victory; but it muſt have been very mortifying to the partizans of the Romiſh church to hear ſuch an eſſential point of their doctrine publicly attacked.

The papal authority being once ſuſpected, Luther proceeded to puſh on his inquiries and attacks from one doctrine to another, till at laſt he began to ſhake the firmeſt foundations on which the wealth and power of the church were eſtabliſhed. Leo then began to perceive that there were no hopes of reclaiming ſuch an incorrigible heretic; and therefore prepared to denounce the ſentence of excommunication againſt him. The college of cardinals was often aſſembled, in order to prepare the ſentence with due deliberation; and the ableſt canoniſts were conſulted how it might be expreſſed with unexceptionable formality. At laſt it was iſſued on the 15th of June 1520. Forty-one propoſitions, extracted out of Luther's works, were therein condemned as heretical, ſcandalous, and offenſive to pious ears; all perſons were forbidden to read his writings, upon pain of excommunication: ſuch as had any of them in their cuſtody were commanded to commit them to the flames: he himſelf, if he did not, within 60 days, publicly recant his errors, and burn his books, was pronounced an obſtinate heretic, excommunicated, and delivered to Satan for the deſtruction of the fleſh: and all ſecular princes were required, under pain of incurring the ſame cenſure, to ſeize his perſon, that he might be puniſhed as his crimes deſerved.

Luther was not in the leaſt diſconcerted by this ſentence, which he had for ſome time expected. He renewed his appeal to a general council; declared the pope to be that antichriſt, or man of ſin, whoſe appearance is foretold in the New Teſtament; declaimed againſt his tyranny with greater vehemence than ever; and at laſt, by way of retaliation, having aſſembled all the profeſſors and ſtudents in the univerſity of Wittemberg, with great pomp, and in the preſence of a vaſt multitude of ſpectators, he caſt the volumes of the canon law, together with the bull of excommunication, into the flames. The manner in which this action was juſtified gave ſtill more offence than the action itſelf. Having collected from the canon law ſome of the moſt extravagant propoſitions with regard to the plenitude and omnipotence of the pope's power, as well as the ſubordination of all ſecular juriſdiction to his authority, he publiſhed theſe with a commentary, pointing out the impiety of ſuch tenets, and their evident tendency to ſubvert all civil government.

On the acceſſion of Charles V. to the empire, Luther found himſelf in a very dangerous ſituation. Charles, in order to ſecure the pope's friendſhip, had determined to treat him with great ſeverity. His eagerneſs to gain this point, rendered him not averſe to gratify the papal legates in Germany, who inſiſted, that without any delay or formal deliberation, the diet then ſitting at Worms ought to condemn a man whom the pope had already excommunicated as an incorrigible heretic. Such an abrupt manner of proceeding, however, being deemed unprecedented and unjuſt by the members of the diet, they made a point of Luther's appearing in perſon, and declaring whether he adhered or not to thoſe opinions which had drawn upon him the cenſures of the church. Not only the emperor, but all the princes through whoſe territories he had to paſs, granted him a ſafe-conduct; and Charles wrote to him at the ſame time, requiring his immediate attendance on the diet, and renewing his promiſes of protection from any injury or violence. Luther did not heſitate one moment about yielding obedience; and ſet out for Worms, attended by the herald who had brought the emperor's letter and ſafe-conduct. While on his journey, many of his friends, whom the fate of Huſs, under ſimilar circumſtances, and notwithſtanding the ſame ſecurity of an imperial ſafe-conduct, filled with ſolicitude, adviſed and entreated him not to ruſh wantonly into the midſt of danger. But Luther, ſuperior to ſuch terrors, ſilenced them with this reply, "I am lawfully called (ſaid he) to appear in that city; and thither will I go in the name of the Lord, though as many devils as there are tiles on the houſes were there combined againſt me."

The reception which he met with at Worms, was ſuch as might have been reckoned a full reward of all his labours, if vanity and the love of applauſe had been the principles by which he was influenced. Greater crowds aſſembled to behold him than had appeared at the emperor's public entry; his apartments were daily filled with princes and perſonages of the higheſt rank; and he was treated with an homage more ſincere, as well as more flattering, than any which pre-eminence in birth or condition can command. At his appearance before the diet, he behaved with great decency, and with equal firmneſs. He readily acknowledged an exceſs of acrimony and vehemence in his controverſial writings; but refuſed to retract his opinions unleſs he were convinced of their falſehood, or to conſent to their being tried by any other rule than the word of God. When neither threats nor intreaties could prevail on him to depart from this reſolution, ſome of the eccleſiaſtics propoſed to imitate the example of the council of Conſtance, and, by puniſhing the author of this peſtilent hereſy, who was now in their power, to deliver the church at once from ſuch an evil. But the members of the diet refuſing to expoſe the German integrity to freſh reproach by a ſecond violation of public faith, and Charles being no leſs unwilling to bring a ſtain upon the beginning of his adminiſtration by ſuch an ignominious action, Luther was permitted to depart in ſafety. A few days after he left the city, a ſevere edict was publiſhed in the emperor's name, and by authority of the diet, depriving him, as an obſtinate and excommunicated criminal, of all the privileges which he enjoyed as a ſubject of the empire, forbidding any prince to harbour or protect him, and requiring all to ſeize his perſon as ſoon as the term ſpecified in his protection ſhould be expired.

But this rigorous decree had no conſiderable effect; the execution of it being prevented partly by the multiplicity of occupations which the commotions in Spain, together with the wars in Italy and the Low Countries, created to the emperor; and partly by a prudent precaution employed by the elector of Saxony, Luther's faithful patron. As Luther, on his return from Worms, was paſſing near Altenſtein in Thuringia, a number of horſemen in maſks ruſhed ſuddenly out of a wood, where the elector had appointed them to lie in wait for him, and ſurrounding his company, carried him, after diſmiſſing all his attendants, to Wartburg, a ſtrong caſtle not far diſtant. There the elector ordered him to be ſupplied with every thing neceſſary or agreeable; but the place of his retreat was carefully concealed, until the fury of the preſent ſtorm againſt him began to abate, upon a change in the political ſyſtem of Europe. In this ſolitude, where he remained nine months, and which he frequently called his *Patmos*, after the name of that iſland to which the apoſtle John was baniſhed, he exerted his uſual vigour and induſtry in defence of his doctrines, or in confutation of his adverſaries, publiſhing ſeveral treatiſes, which revived the ſpirit of his followers, aſtoniſhed to a great degree and diſheartened at the ſudden diſappearance of their leader.

Luther, weary at length of his retirement, appeared publicly again at Wittemberg, upon the 6th of March 1522. He appeared indeed without the elector's leave; but immediately wrote him a letter to prevent his taking it ill. The edict of Charles V. as ſevere as it was, had given little or no check to Luther's doctrine; for the emperor was no ſooner gone to Flanders, than his edict was neglected and deſpiſed, and the doctrine ſeemed to ſpread even faſter than ever. Carolſtadius, in Luther's abſence, had puſhed things on faſter than his leader; and had attempted to aboliſh the uſe of maſs, to remove images out of the churches, to ſet aſide auricular confeſſion, invocation of ſaints, the abſtaining from meats; had allowed the monks to leave their monaſteries, to neglect their vows, and to marry; in ſhort, had quite changed the doctrine and diſcipline of the church at Wittemberg: all which, though not againſt Luther's ſentiments, was yet blamed by him, as being raſhly and unſeaſonably done. Lutheraniſm was ſtill confined to Germany: it was not got to France; and Henry VIII. of England made the moſt rigorous acts to hinder it from invading his realm. Nay, he did ſomething more: to ſhow his zeal for religion and the holy ſee, and perhaps his ſkill in theological learning, he wrote a treatiſe *Of the ſeven ſacraments*, againſt Luther's book *Of the captivity of Babylon*; which he preſented to Leo X. in October 1521. The pope received it very favourably; and was ſo well pleaſed with the king of England, that he complimented him with the title of *Defender of the Faith*. Luther, however, paid no regard to his kingſhip: but anſwered him with great ſharpneſs, treating both his perſon and performance in the moſt contemptuous manner. Henry complained of Luther's rude uſage of him to the princes of Saxony; and Fiſher, biſhop of Rocheſter, replied to his anſwer, in behalf of Henry's treatiſe: but neither the king's complaint, nor the biſhop's reply, was attended with any viſible effects.

L[illegible] [illegible] [illegible] p[illegible] of C[illegible] [illegible] the pope and biſhops [illegible] [illegible] people [illegible] their authority [illegible] he wrote one book againſt the pope's bull, and another againſt the order falſely called the *order of biſhops*. The ſame year, 1522, he wrote a letter, dated [illegible] the 2[illegible] [illegible] in which he aſſured them that he was labouring to eſtabliſh their doctrine in Germany, and exhorted them not to return to the communion of the church of Rome; and he publiſhed alſo this year, a tranſlation of the New Teſtament in the German tongue, which was afterwards corrected by himſelf and Melancthon. This tranſlation having been printed ſeveral times, and being in every body's hands, Ferdinand archduke of Auſtria, the emperor's brother, made a very ſevere edict, to hinder the farther publication of it; and forbade all the ſubjects of his imperial majeſty to have any copies of it, or of Luther's other books. Some other princes followed his example; and Luther was ſo angry at it, that he wrote a treatiſe, *Of the ſecular power*, in which he accuſes them of tyranny and impiety. The diet of the empire was held at Nuremberg, at the end of the year; to which Hadrian VI. ſent his brief, dated November the 25th: for Leo X. died upon the 2d of December 1521, and Hadrian had been elected pope upon the 9th of January following. In this brief, among other things, he obſerves to the diet, how he had heard with grief, that Martin Luther, after the ſentence of Leo X. which was ordered to be executed by the edict of Worms, continued to teach the ſame errors, and daily to publiſh books full of hereſies: that it appeared ſtrange to him, that ſo large and ſo religious a nation could be ſeduced by a wretched apoſtate friar: that nothing, however, could be more pernicious to Chriſtendom; and that therefore he exhorts them to uſe their utmoſt endeavours to make Luther, and the authors of theſe tumults, return to their duty: or, if they refuſe and continue obſtinate, to proceed againſt them according to the laws of the empire, and the ſeverity of the laſt edict.

The reſolution of this diet was publiſhed in the form of an edict, upon the 6th of March 1523; but it had no effect in checking the Lutherans, who ſtill went on in the ſame triumphant manner. This year Luther wrote a great many pieces: among the reſt, one upon the dignity and office of the ſupreme magiſtrate; which Frederic elector of Saxony is ſaid to have been highly pleaſed with. He ſent, about the ſame time a writing in the German language to the Waldenſes, or Pickards, in Bohemia and Moravia, who had applied to him "about worſhipping the body of Chriſt in the euchariſt." He wrote alſo another book, which he dedicated to the ſenate and people of Prague, "about the inſtitution of miniſters of the church." He drew up a form of ſaying maſs. He wrote a piece, entitled, *An example of popiſh doctrine and divinity*; which Dupin calls *a ſatire againſt nuns and thoſe who profeſs a monaſtic life*. He wrote alſo againſt the vows of virginity, in his preface to his commentary on 1 Cor. viii. And his exhortations here were, it ſeems, followed with effects; for ſoon after, nine nuns, among whom was Catharine de Bore, eloped from the nunnery at Nimptſchen, and were brought, by the aſſiſtance of Leonard Coppen, a burgeſs of Torgau, to Wittemberg. Whatever offence this proceeding might give to the Papiſts, it was highly extolled by Luther; who, in a book written in the German language, compares the deliverance of theſe nuns from the ſlavery of a monaſtic life to that of the ſouls which Jeſus Chriſt has delivered by his death. This year Luther had occaſion to canonize two of his followers, who, as Melchior Adam relates, were burnt at Bruſſels in the beginning of July, and were the firſt who ſuffered martyrdom for his doctrine. He wrote alſo a conſolatory epiſtle to three noble ladies at Miſnia, who were baniſhed from the duke of Saxony's court at Friburg, for reading his books.

In the beginning of the year 1524, Clement VII. ſent a legate into Germany to the diet, which was to be held at Nuremburg. Hadrian VI. died in October 1523, and was ſucceeded by Clement upon the 19th of November. A little before his death he canonized Benno, who was biſhop of Meiſſen in the time of Gregory VII. and one of the moſt zealous defenders of the holy ſee. Luther, imagining that this was done directly to oppoſe him, drew up a piece with this title, *Againſt the New Idol and Old Devil ſet up at Meiſſen*; in which he treats the memory of Gregory with great freedom, and does not ſpare even Hadrian. Clement VII.'s legate repreſented to the diet of Nuremburg the neceſſity of enforcing the execution of the edict of Worms, which had been ſtrangely neglected by the princes of the empire; but, notwithſtanding the legate's ſolicitations, which were very preſſing, the decrees of that diet were thought ſo ineffectual, that they were condemned at Rome, and rejected by the emperor. It was in this year that the diſpute between Luther and Eraſmus, about free-will, began. Eraſmus had been much courted by the Papiſts to write againſt Luther; but he was all along of opinion, that writing would not be found an effectual way to end the differences and eſtabliſh the peace of the church. However, tired out at length with the importunities of the pope and the catholic princes, and deſirous at the ſame time to clear himſelf from the ſuſpicion of favouring a cauſe which he would not ſeem to favour, he reſolved to write againſt Luther, though, as he tells Melancthon, it was with ſome reluctance, and choſe free-will for the ſubject. His book was intitled, *A Diatriba, or Conference about Free-will*; and was written with much moderation, and without perſonal reflections. He tells Luther in the preface, "That he ought not to take his diſſenting from him in opinion ill, becauſe he had allowed himſelf the liberty of differing from the judgement of popes, councils, univerſities, and doctors of the church." Luther was ſome time before he anſwered Eraſmus's book; but at laſt publiſhed a treatiſe *De Servo Arbitrio*, or *Of the Servitude of Man's Will*; and though Melancthon had promiſed Eraſmus, that Luther ſhould anſwer him with civility and moderation, yet Luther had ſo little regard to Melancthon's promiſe, that he never wrote any thing ſharper. He accuſed Eraſmus of being careleſs about religion, and little ſolicitous what became of it, provided the world continued in peace; and that his notions were rather philoſophical than Chriſtian. Eraſmus immediately replied to Luther, in a piece called *Hyperaſpiſtes*; in the firſt part of which he anſwers his arguments, and in the ſecond his perſonal reflections.

In October 1524, Luther threw off the monaſtic habit; which, though not premeditated and deſigned, was yet a very proper preparative to a ſtep he took the year after; we mean, his marriage with Catharine de Bore. Catharine de Bore was a gentleman's daughter, who had been a nun, and was taken, as we have obſerved, out of the nunnery of Nimptſchen, in the year 1523. Luther had a deſign, as Melchior Adam related, to marry her to Glacius, a miniſter of Ortamunden; but ſhe did not like Glacius; and ſo Luther married her himſelf upon the 13th of June 1525. This conduct of his was blamed not only by the Catholics, but, as Melancthon ſays, by thoſe of his own party. He was even for ſome time aſhamed of it himſelf; and owns, that his marriage had made him ſo deſpicable, that he hoped his humiliation would rejoice the angels, and vex the devils. Melancthon found him ſo afflicted with what he had done, that he wrote ſome letters of conſolation to him. It was not ſo much the marriage, as the circumſtances of the time, and the precipitation with which it was done, that occaſioned the cenſures paſſed upon Luther. He married all of a ſudden, and at a time when Germany was groaning under the miſeries of a war which was ſaid at leaſt to be owing to Lutheraniſm. Then, again, it was thought an indecent thing in a man of 42 years of age, who was then, as he pretended, reſtoring the Goſpel, and reforming mankind, to involve himſelf in marriage with a woman of 26, either through incontinence, or any account whatever. But Luther, as ſoon as he had recovered himſelf a little from this abaſhment, aſſumed his former air of intrepidity, and boldly ſupported what he had done with reaſons. "I took a wife (ſays he), in obedience to my father's commands; and haſtened the conſummation, in order to prevent impediments, and ſtop the tongues of ſlanderers." It appears from his own confeſſion, that this reformer was very fond of Mrs de Bore, and uſed to call her *his Catharine*, which made profane people think and ſay wicked things of him: "And therefore (ſays he) I married of a ſudden, not only that I might not be obliged to hear the clamours which I knew would be raiſed againſt me, but to ſtop the mouths of thoſe who reproached me with Catharine de Bore." Luther alſo gives us to underſtand, that he did it partly as concurring with his grand ſcheme of oppoſing the Catholics.

Luther, notwithſtanding, was not himſelf altogether ſatisfied with theſe reaſons. He did not think the ſtep he had taken could be ſufficiently juſtified upon the principles of human prudence; and therefore we find him, in other places, endeavouring to account for it from a ſupernatural impulſe. But whether there was any thing divine in it or not, Luther found himſelf extremely happy in his new ſtate, and eſpecially after his wife had brought him a ſon. "My rib Kate (ſays he in the joy of his heart) deſires her compliments to you, and thanks you for the favour of your kind letter. She is very well, through God's mercy. She is obedient and complying with me in all things; and more agreeable, I thank God, than I could have expected; ſo that I would not change my poverty for the wealth of Crœſus." He was heard to ſay (Seckendorf tells us,) that he would not exchange his wife for the kingdom of France, nor for the riches of the Venetians; and that for three reaſons: Becauſe ſhe had been given him by God, at the time when he implored the aſſiſtance of the Holy Ghoſt in finding a good wife; ſecondly, Becauſe, though ſhe was not without faults, yet ſhe had fewer than other women; and, thirdly, Becauſe ſhe religiouſly obſerved the conjugal fidelity ſhe owed him. There went at firſt a report, that Catharine de Bore was brought to bed ſoon after her marriage with Luther; but Eraſmus, who had wrote that news to his friends, acknowledged the falſity of it a little after.

His marriage, however, did not retard his activity and diligence in the work of reformation. He revived the Augſburg confeſſion of faith, and apology for the Proteſtants, when the Proteſtant religion was firſt eſtabliſhed on a firm baſis. See PROTESTANTS and REFORMATION.

After this, Luther had little elſe to do than to ſit down and contemplate the mighty work he had finiſhed: for that a ſingle monk ſhould be able to give the church ſo rude a ſhock, that there needed but ſuch another entirely to overthrow it, may very well ſeem a mighty work. He did indeed little elſe: for the remainder of his life was ſpent in exhorting princes, ſtates, and univerſities, to confirm the reformation which had been brought about through him; and publiſhing from time to time ſuch writings as might encourage, direct, and aid, them in doing it. The emperor threatened temporal puniſhment with armies, and the pope eternal with bulls and anathemas; but Luther cared for none of their threats. His friend and coadjutor Melancthon was not ſo indifferent; for Melancthon had a great deal of ſoftneſs, moderation, and diffidence in his make, which made him very uneaſy, and even ſorrowful, in the preſent diſorders. Hence we find many of Luther's letters written on purpoſe to ſupport and comfort him under theſe ſeveral diſtreſſes and anxieties.

In the year 1533, Luther wrote a conſolatory epiſtle to the citizens of Oſchatz, who had ſuffered ſome hardſhips for adhering to the Augſburg confeſſion of faith; in which, among other things, he ſays; "The devil is the hoſt, and the world is his inn; ſo that wherever you come, you ſhall be ſure to find this ugly hoſt." He had alſo about this time a terrible controverſy with George duke of Saxony, who had ſuch an averſion to Luther's doctrine, that he obliged his ſubjects to take an oath that they would never embrace it. However, 60 or 70 citizens of Leipſic were found to have deviated a little from the Catholic way in ſome point or other, and they were known previouſly to have conſulted Luther about it; upon which George complained to the elector John, that Luther had not only abuſed his perſon, but alſo preached up rebellion among his ſubjects. The elector ordered Luther to be acquainted with this; and to be told at the ſame time, that if he did not clear himſelf of the charge, he could not poſſibly eſcape puniſhment. But Luther eaſily refuted the accuſation, by proving, that he had been ſo far from ſtirring up his ſubjects againſt him, on the ſcore of religion, that on the contrary, he had exhorted them rather to undergo the greateſt hardſhips, and even ſuffer themſelves to be baniſhed.

In the year 1534, the Bible tranſlated by him into German was firſt printed, as the old privilege, dated at Bibliopolis, under the elector's hand, ſhows: and it was publiſhed the year after. He alſo publiſhed this year a book againſt maſſes and the conſecration of prieſts, in which he relates a conference he had with the devil upon thoſe points; for it is remarkable in Luther's whole hiſtory, that he never had any conflicts of any kind within, but the devil was always his antagoniſt.

Luther.

goniſt. In February 1537, an aſſembly was held at Smalkald about matters of religion, to which Luther and Melancthon were called. At this meeting Luther was ſeized with ſo grievous an illneſs, that there were no hopes of his recovery. He was afflicted with the ſtone, and had a ſtoppage of urine for 11 days. In this terrible condition he would needs undertake to travel, notwithſtanding all that his friends could ſay or do to prevent him: his reſolution, however, was attended with a good effect; for the night after his departure he began to be better. As he was carried along, he made his will, in which he bequeathed his deteſtation of Popery to his friends and brethren; agreeably to what he often uſed to ſay: *Peſtis eram vivus, moriens ero mors tua, papa*; that is, "I was the plague of Popery in my life, and ſhall continue to be ſo in my death."

This year the pope and the court of Rome, finding it impoſſible to deal with the Proteſtants by force, began to have recourſe to ſtratagem. They affected therefore to think, that though Luther had indeed carried things on with a high hand and to a violent extreme, yet what he had pleaded in defence of theſe meaſures was not entirely without foundation. They talked with a ſeeming ſhow of moderation: and Pius III. who ſucceeded Clement VII. propoſed a reformation firſt among themſelves, and even went ſo far as to fix a place for a council to meet at for that purpoſe. But Luther treated this farce as it deſerved to be treated; unmaſked and detected it immediately; and, to ridicule it the more ſtrongly, cauſed a picture to be drawn, in which was repreſented the pope ſeated on high upon a throne, ſome cardinals about him with foxes tails on, and ſeeming to evacuate upwards and downwards (*ſurſum deorſum repurgare*, as Melchior Adam expreſſes it). This was fixed over againſt the title-page, to let the readers ſee at once the ſcope and deſign of the book; which was, to expoſe that cunning and artifice with which thoſe ſubtle politicians affected to cleanſe and purify themſelves from their errors and ſuperſtitions. Luther publiſhed about the ſame time A Confutation of the pretended Grant of Conſtantine to Sylveſter Biſhop of Rome; and alſo ſome letters of John Huſs, written from his priſon at Conſtance to the Bohemians.

In this manner was Luther employed till his death, which happened in the year 1546. That year, accompanied by Melancthon, he paid a viſit to his own country, which he had not ſeen for many years, and returned again in ſafety. But ſoon after he was called thither again by the earls of Mansfeldt, to compoſe ſome differences which had ariſen about their boundaries. Luther had not been uſed to ſuch matters; but becauſe he was born at Eiſleben, a town in the territory of Mansfeldt, he was willing to do his country what ſervice he could, even in this way. Preaching his laſt ſermon therefore at Wittemberg, upon the 17th of January, he ſet off on the 23d; and at Hall in Saxony lodged with Juſtus Jonas, with whom he ſtaid three days, becauſe the waters were out. Upon the 28th, he paſſed over the river with his three ſons and Dr Jonas; and being in ſome danger, he ſaid to the Doctor, "Do not you think it would rejoice the devil exceedingly, if I and you, and my three ſons, ſhould be drowned?" When he entered the territories of the earls of Mansfeldt, he was received by 100 horſemen or more, and conducted in a very honourable manner; but was at the ſame time ſo very ill, that it was feared he would die. He ſaid, that theſe fits of ſickneſs often came upon him when he had any great buſineſs to undertake: of this, however, he did not recover; but died upon the 18th of February, in the 63d year of his age. A little before he expired, he admoniſhed thoſe that were about him to pray to God for the propagation of the Goſpel: "becauſe (ſaid he) the council of Trent, which had ſat once or twice, and the pope, would deviſe ſtrange things againſt it." Soon after, his body was put into a leaden coffin, and carried with funereal pomp to the church at Eiſleben, when Dr Jonas preached a ſermon upon the occaſion. The earls of Mansfeldt deſired that his body ſhould be interred in their territories; but the elector of Saxony inſiſted upon his being brought back to Wittemberg; which was accordingly done: and there he was buried with the greateſt pomp that perhaps ever happened to any private man. Princes, earls, nobles, and ſtudents without number, attended the proceſſion; and Melancthon made his funeral oration.

Luther.

A thouſand lies were invented by the Papiſts about Luther's death. Some ſaid that he died ſuddenly; others, that he killed himſelf; others, that the devil ſtrangled him; others, that his corpſe ſtunk ſo abominably, that they were forced to leave it in the way, as it was carried to be interred. Nay, lies were invented about his death, even while he was yet alive. Luther, however, to give the moſt effectual refutation of this account of his death, put forth an advertiſement of his being alive; and, to be even with the Papiſts for the malice they had ſhown in this lie, wrote a book at the ſame time to prove, that "the papacy was founded by the devil."

Luther's works were collected after his death, and printed at Wittemberg in 7 vols folio. Catharine de Bore ſurvived her huſband a few years; and continued the firſt year of her widowhood at Wittemberg, though Luther had adviſed her to ſeek another place of reſidence. She went from thence in the year 1547, when the town was ſurrendered to the emperor Charles V. Before her departure, ſhe had received a preſent of 50 crowns from Chriſtian III. king of Denmark; and the elector of Saxony, and the counts of Mansfeldt, gave her good tokens of their liberality. With theſe additions to what Luther had left her, ſhe had wherewithal to maintain herſelf and her family handſomely. She returned to Wittemberg, when the town was reſtored to the elector; where ſhe lived in a very devout and pious manner, till the plague obliged her to leave it again in the year 1552. She ſold what ſhe had at Wittemberg: and retired to Torgau, with a reſolution to end her life there. An unfortunate miſchance befel her in her journey thither, which proved fatal to her. The horſes growing unruly, and attempting to run away, ſhe leaped out of the vehicle ſhe was conveyed in; and, by leaping, got a fall, of which ſhe died about a quarter of a year after, at Torgau, upon the 20th of December 1552. She was buried there in the great church, where her tomb and monument are ſtill to be ſeen; and the univerſity of Wittemberg, which was then at Torgau becauſe the plague raged at Wittemberg,

berg, made a public programma concerning the funeral pomp.

LUTHERANISM, the ſentiments of Martin Luther with regard to religion. See LUTHER.

Lutheraniſm has undergone ſome alterations ſince the time of its founder.—Luther rejected the epiſtle of St James as inconſiſtent with the doctrine of St Paul, in relation to juſtification; he alſo ſet aſide the Apocalypſe: both which are now received as canonical in the Lutheran church.

Luther reduced the number of ſacraments to two, viz. baptiſm, and the euchariſt: but he believed the impanation, or conſubſtantiation, that is, that the matter of the bread and wine remain with the body and blood of Chriſt; and it is in this article that the main difference between the Lutherans and Engliſh churches conſiſts.

Luther maintained the maſs to be no ſacrifice; exploded the adoration of the hoſt, auricular confeſſion, meritorious works, indulgences, purgatory, the worſhip of images, &c. which had been introduced in the corrupt times of the Romiſh church. He alſo oppoſed the doctrine of free will, maintained predeſtination, and aſſerted our juſtification to be ſolely by the imputation of the merits and ſatisfaction of Chriſt. He alſo oppoſed the faſtings in the Roman church, monaſtical vows, the celibate of the clergy, &c.

LUTHERANS, the Chriſtians who follow the opinions of Martin Luther, one of the principal reformers of the church in the 16th century. See LUTHER.

The Lutherans, of all Proteſtants, are thoſe who differ leaſt from the Romiſh church; as they affirm, that the body and blood of Chriſt are materially preſent in the ſacrament of the Lord's ſupper, though in an incomprehenſible manner; and likewiſe repreſent ſome religious rites and inſtitutions, as the uſe of images in churches, the diſtinguiſhing veſtments of the clergy, the private confeſſion of ſins, the uſe of wafers in the adminiſtration of the Lord's ſupper, the form of exorciſm in the celebration of baptiſm, and other ceremonies of the like nature, as tolerable, and ſome of them as uſeful. The Lutherans maintain, with regard to the divine decrees, that they reſpect the ſalvation or miſery of men, in conſequence of a previous knowledge of their ſentiments and characters, and not as free and unconditional, and as founded on the mere will of God. Towards the cloſe of the laſt century, the Lutherans began to entertain a greater liberality of ſentiment than they had before adopted; though in many places they perſevered longer in ſevere and deſpotic principles than other Proteſtant churches. Their public teachers now enjoy an unbounded liberty of diſſenting from the deciſions of thoſe ſymbols or creeds which were once deemed almoſt infallible rules of faith and practice, and of declaring their diſſent in the manner they judge the moſt expedient. Moſheim attributes this change in their ſentiments to the maxim which they generally adopted, that Chriſtians were accountable to God alone for their religious opinions; and that no individual could be juſtly puniſhed by the magiſtrate for his erroneous opinions, while he conducted himſelf like a virtuous and obedient ſubject, and made no attempts to diſturb the peace and order of civil ſociety.

LUTHERN, in *Architecture*, a kind of window over the cornice, in the roof of a building; ſtanding perpendicularly over the naked of a wall, and ſerving to illuminate the upper ſtory.

Lutherns are of various forms; as ſquare, ſemicircular, round, called *bull's eyes*, *flat arches*, &c.

LUTRA, in *Zoology*. See MUSTELA, MAMMALIA *Index*.

LUTTI, BENEDETTO, an eminent painter, born at Florence in 1666. He was the diſciple of Antonio Dominico Gabiani, and his merit was judged equal to that of his maſter: he painted few beſide eaſel pieces; and his works were much valued and ſought for in England, France, and Germany. The emperor knighted him; and the elector of Mentz, together with his patent of knighthood, ſent him a croſs ſet with diamonds. Lutti was never ſatiſfied in finiſhing his pictures; yet though he often retouched them, they never appeared laboured. He died in 1724.

LUTZEN, a town of Upper Saxony in Germany; famous for a battle fought here in 1632, when Guſtavus Adolphus king of Sweden was killed. It is ſituated on the river Elſter, in E. Long. 12. 37. N. Lat. 51. 20.

LUXATION, is when any bone is moved out of its place of articulation, ſo as to impede or deſtroy its proper office or motion. See SURGERY.

LUXEMBURG, a city of the Auſtrian Netherlands, and capital of a duchy of the ſame name. It is ſeated partly on a hill, and partly on a plain; it is very ſtrong both by art and nature. It is but indifferently built, though there are ſome good ſtone-houſes in it. There is nothing very remarkable among the ſtructures but the Jeſuits church; which is a handſome edifice, after the modern taſte. It was taken by Louis XIV. in 1684; who ſo augmented the fortifications, that it is now one of the ſtrongeſt towns in Europe. It was ceded to Spain by the treaty of Ryſwick; but the French took it again in 1701, and gave it up to the houſe of Auſtria by the treaty of Utrecht. It is 25 miles ſouth-weſt of Treves, and 100 weſt of Mentz. E. Long. 6. 10. N. Lat. 49. 52.

LUXEMBURG, the duchy of, is one of the 17 provinces of the Netherlands. It is bounded on the eaſt by the archbiſhopric of Treves; on the ſouth by Lorrain; on the weſt, partly by Champagne, and partly by the biſhopric of Liege, which likewiſe, with part of Limburg, bound it on the north. It lies in the foreſt of Ardenne, which is one of the moſt famous in Europe. In ſome places it is covered with mountains and woods, and in general it is fertile in corn and wine; and here are a great number of iron mines. The principal rivers are the Moſelle, the Sour, the Ourte, and the Semoy. It belongs partly to the houſe of Auſtria, and partly to the French; and Thionville is the capital of the French part.

LUXEMBURG, *François Henry de Montmorenci*, duke of, and marſhal of France, a renowned general in the ſervice of Louis XIV. was born in 1628. He was with the prince of Condé at the battle of Rocroy, in 1643; and in 1668 diſtinguiſhed himſelf at the conqueſt of Franche Compté. In 1672, he commanded in chief the French army in Holland; when he defeated the enemy near Woerden and Bodegrave, and was univerſally admired for the fine retreat he made in 1673. He became marſhal of France in 1675; gained the battle of Fleurs in 1690, that of Steenkirk in 1682, and that of Nerwind in 1693. He died in Verſailles in 1695.

LUXURIANS flos, "a luxuriant or double flower;" a flower, ſome of whoſe parts are increaſed in number, to the diminution or entire excluſion of others.

The parts that are augmented or multiplied in luxuriant flowers, are the flower cup and petals, which Linnæus conſiders as the teguments or covers of the flower: the parts that are diminiſhed, or entirely excluded, are the ſtamina or chives, which the ſame author denominates the male organs of generation.

Luxuriance in flowers is capable of the three following varieties.

1. A flower is ſaid to be MULTIPLIED (*flos multiplicatus*), when the increaſe of the petals is not ſuch as to exclude all the ſtamina: in this ſenſe, flowers are properly ſaid to be double, triple, or quadruple, according to the number of multiplications of the petals.

2. A flower is ſaid to be FULL (*flos plenus*), when, by the multiplication of the petals, all the ſtamina are excluded. Such are moſt of the double flowers that engage the attention of floriſts.

3. A flower is ſaid to be PROLIFIC (*flos prolifer*), which produces flowers, and ſometimes leaves, from its centre.

For a particular deſcription of each of theſe kinds of luxuriance in flowers, ſee the articles *MULTIPLICATUS Flos*, *PLENUS Flos*, and *PROLIFER Flos*.

Many natural orders of plants do not in any circumſtances produce luxuriant flowers. Of this kind are the maſqued flowers of Tournefort, excepting calve's-ſnout; the rough-leaved, umbelliferous, ſtarry plants, and ſuch as flower at the joints, of Ray: ſome umbelliferous flowers, however, are *prolific*.

The pea-bloom, or butterfly-ſhaped flowers, are rarely rendered double; ſome inſtances, however, of luxuriance, are obſerved in a ſpecies of lady's finger, coronilla, and broom.

All luxuriant flowers are vegetable monſters. Such as are perfectly full, by which we mean the greateſt degree of luxuriance, cannot be propagated by ſeeds; becauſe theſe, for want of impregnation, can never ripen. Full flowers therefore are very properly denominated by Linnæus *eunuchs*. This higheſt degree of luxuriance is very common in carnation, lychnis, anemone, ſtock, Indian creſs, roſe, marſh marigold, ranunculus, violet, peony, and narciſſus.

Flowers which do not exclude all the ſtamina, perfect their ſeeds. Of this kind are poppy, fennel-flower, campanula, and ſome others.

Some flowers, as thoſe of the water-lily, fig-marigold, and cactus, have many rows or ſeries of petals, without the number of ſtamina being in the leaſt diminiſhed. Such flowers are by no means to be reckoned luxuriant, in the ſlighteſt degree.

Luxuriance in flowers is generally owing to exceſs of nouriſhment.

LUXURY; voluptuouſneſs, or an extravagant indulgence in diet, dreſs, and equipage.

Luxury, among the Romans, prevailed to ſuch a degree, that ſeveral laws were made to ſuppreſs, or at leaſt limit it. The extravagance of the table began about the time of the battle of Actium, and continued in great exceſs till the reign of Galba. Peacocks, cranes of Malta, nightingales, veniſon, wild and tame fowl, were conſidered as delicacies. A profuſion of proviſions was the reigning taſte. Whole wild boars were often ſerved up, and ſometimes they were filled with various ſmall animals, and birds of different kinds: this diſh they called the *Trojan horſe*, in alluſion to the wooden horſe filled with ſoldiers. Fowls and game of all ſorts were ſerved up in whole pyramids, piled up in diſhes as broad as moderate tables. Lucullus had a particular name for each apartment; and in whatever room he ordered his ſervants to prepare the entertainment, they knew by the direction the expence to which they were to go. When he ſupped in the Apollo, the expence was fixed at 50,000 *drachmas*, that is 1250l. M. Antony provided eight boars for 12 gueſts. Vitellius had a large ſilver platter, ſaid to have coſt a million of *ſeſterces*, called *Minerva's buckler*. In this he blended together the livers of gilt-heads, the brains of pheaſants and peacocks, the tongues of phenicopters, and the milts of lampreys. Caligula ſerved up to his gueſts pearls of great value diſſolved in vinegar; the ſame was done alſo by Clodius the ſon of Æſop the tragedian. Apicius laid aſide 90,000,000 of *ſeſterces*, beſides a mighty revenue, for no other purpoſe but to be ſacrificed to luxury; finding himſelf involved in debt, he looked over his accounts, and though he had the ſum of 10,000,000 of *ſeſterces* ſtill left, he poiſoned himſelf for fear of being ſtarved to death.

The Roman laws to reſtrain luxury were *Lex Orchia*, *Fannia*, *Didia*, *Licinia*, *Cornelia*, and many others: But all theſe were too little; for as riches increaſed amongſt them, ſo did ſenſuality.

What were the ideas of luxury entertained in England about two centuries ago, may be gathered from the following paſſage of Holinſhed; who, in a diſcourſe prefixed to his Hiſtory, ſpeaking of the increaſe of luxury, ſays, "Neither do I ſpeak this in reproach of any man, God is my judge; but to ſhow, that I do rejoice rather to ſee how God has bleſſed us with his good gifts, and to behold how that in a time wherein all things are grown to the moſt exceſſive prices, we yet do find means to obtain and atchieve ſuch furniture as heretofore was impoſſible. There are old men yet dwelling in the village where I remain, which have noted three things to be marvelouſly altered in England within their ſound remembrance. One is the multitude of chimneys lately erected; whereas in their young days there were not above two or three, if ſo many, in moſt uplandiſh towns of the realm (the religious houſes, and manor places of their lords, always excepted, and peradventure ſome great perſonages), but each made his fire againſt a reredoſs [ſkreen] in the hall where he dreſſed his meat and dined.—The ſecond is the great amendment of lodging; for, ſaid they, our fathers and we ourſelves have lain full oft upon ſtraw pallets covered only with a ſheet, under coverlits made of a dogſwaine or horharriots (to uſe their own terms), and a good log under their head inſtead of a bolſter.—If it were ſo that the father or goodman of the houſe had a mattraſs, or flock bed and ſheets, a ſack of chaff to reſt his head upon, he thought himſelf to be as well lodged as the lord of the town. So well were they contented, that pillows (ſaid they) were thought meet only for women in childbed; as for ſervants, if they had any ſheet above them, it was well; for ſeldom had they any under their bodies to keep them from pricking ſtraws, that ran oft through the canvas and their hardened hides.—The third thing they tell of, is the exchange of treene [wooden] platters into pewter, and wooden ſpoons into ſilver or tin; for ſo common were all ſorts of treene veſſels in old times, that a man ſhould hardly find four pieces pewter (of which one was peradventure a ſalt) in a good farmer's houſe. Again, In times paſt, men were contented to dwell in houſes builded of ſallow, willow, &c. ſo that the uſe of oak was in a manner dedicated wholly unto churches, religious houſes, princes palaces, navigation, &c. But now willow, &c. are rejected, and nothing but oak anywhere regarded; and yet ſee the change, for when our houſes were builded of willow, then had we oaken men; but now that our houſes are come to be made of oak, our men are not only become willow, but a great many altogether of ſtraw, which is a ſore alteration. In theſe the courage of the owner was a ſufficient defence to keep the houſe in ſafety; but now the aſſurance of the timber muſt defend the men from robbing. Now have we many chimneys, and yet our tenderlins complain of rheums, catarrhs, and poſes; then had we none but reredoſes, and our heads did never ach. For as the ſmoke in thoſe days were ſuppoſed to be a ſufficient hardening for the timber of the houſe; ſo it was reputed a far better medicine to keep the goodman and his family from the quacks or poſe; wherewith, as then, very few were acquainted. Again, Our pewterers in time paſt employed the uſe of pewter only upon diſhes and pots, and a few other trifles for ſervice; whereas now they are grown into ſuch exquiſite cunning, that they can in a manner imitate by infuſion any form or faſhion, of cup, diſh, ſalt, bowl, or goblet, which is made by the goldſmith's craft, though they be ever ſo curious and very artificially forged. In ſome places beyond the ſea, a garniſh of good flat Engliſh pewter (I ſay flat, becauſe diſhes and platters in my time began to be made deep, and like baſons, and are indeed more convenient both for ſauce and keeping the meat warm) is eſteemed ſo precious as the like number of veſſels that are made of fine ſilver."

Particular inſtances of luxury, in *eating*, however, might be adduced from an earlier period, ſurpaſſing even the extravagance of the Romans. Thus, in the 10th year of the reign of Edward IV. (1470), George Nevill, brother to the earl of Warwick, at his inſtalment into the archiepiſcopal ſee of York, entertained moſt of the nobility and principal clergy, when his bill of fare was 300 quarters of wheat, 350 tuns of ale, 104 tuns of wine, a pipe of ſpiced wine, 80 fat oxen, ſix wild bulls, 1004 weathers, 300 hogs, 300 calves, 3000 geeſe, 3000 capons, 300 pigs, 100 peacocks, 200 cranes, 200 kids, 2000 chickens, 4000 pigeons, 4000 rabbits, 204 bitterns, 4000 ducks, 200 pheaſants, 500 partridges, 200 woodcocks, 400 plovers, 100 curlews, 100 quails, 1000 egrets, 200 rees, 400 bucks, does, and roebucks, 1506 hot veniſon paſties, 4000 cold ditto, 1000 diſhes of jelly parted, 3000 diſhes of jelly plain, 3000 cold cuſtards, 2000 hot cuſtards, 300 pikes, 300 breams, eight ſeals, four porpeſſes, 400 tarts. At this feaſt the earl of Warwick was ſteward, the earl of Bedford treaſurer, and Lord Haſtings comptroller, with many more noble officers, 1000 ſervitors, 62 cooks, 515 menial apparitors in the kitchen.—But ſuch was the fortune of the man, that after his extreme prodigality he died in the moſt abject but unpitied poverty, *vinctus jacuit in ſumma inopia.*

And as to *dreſs*, luxury in that article ſeems to have attained a great height long before Holinſhed's time: For in the reign of Edward III. we find no fewer than ſeven ſumptuary laws paſſed in one ſeſſion of parliament to reſtrain it. It was enacted, that men ſervants of lords, as alſo of tradeſmen and artiſans, ſhall be content with one meal of fiſh or fleſh every day; and the other meals, daily, ſhall be of milk, cheeſe, butter and the like. Neither ſhall they uſe any ornaments of gold, ſilk, or embroidery; nor their wives and daughters any veils above the price of twelvepence. Artiſans and yeomen ſhall not wear cloth above 40s. the whole piece (the fineſt then being about 6l. per piece), nor the ornaments before named. Nor the women any veils of ſilk, but only thoſe of thread made in England. Gentlemen under the degree of knights, not having 100l. yearly in land, ſhall not wear any cloth above 4½ marks the whole piece. Neither ſhall they or their females uſe cloth of gold, ſilver, or embroidery, &c. But eſquires having 200l. per annum or upwards of rent, may wear cloths of five marks the whole piece of cloth; and they and their females may alſo wear ſtuff of ſilk, ſilver, ribbons, girdles, or furs. Merchants, citizens, burghers, and artificers or tradeſmen, as well of London as elſewhere, who have goods and chattels of the clear value of 500l. and their females, may wear as is allowed to gentlemen and eſquires of 100l. per annum. And merchants, citizens, and burgeſſes, worth above 1000l. in goods and chattels, may (and their females) wear the ſame as gentlemen of 200l. per annum. Knights of 200 marks yearly may wear cloth of ſix marks the cloth, but no higher; but no cloth of gold, nor furred with ermine: but all knights and ladies having above 400 marks yearly, up to 1000l. per annum, may wear as they pleaſe, ermine excepted; and they may wear ornaments of pearl and precious ſtones for their heads only. Clerks having degrees in cathedrals, colleges, &c. may wear as knights and eſquires of the ſame income. Plowmen, carters, ſhepherds, and ſuch like, not having 40s. value in goods or chattels, ſhall wear no ſort of cloth but blanket and ruſſet lawn of 12d. and ſhall wear girdles and belts; and they ſhall only eat and drink ſuitable to their ſtations. And whoſoever uſes other apparel than is preſcribed by the above laws ſhall forfeit the ſame.

Concerning the general utility of luxury to a ſtate, there is much controverſy among the political writers. Baron Monteſquieu lays it down, that luxury is neceſſary in monarchies, as in France; but ruinous to democracies, as in Holland. With regard therefore to Britain, whoſe government is compounded of both ſpecies, it is held to be a dubious queſtion, how far private luxury is a public evil; and, as ſuch, cognizable by public laws. And indeed our legiſlators have ſeveral times changed their ſentiments as to this point; for formerly there were a number of penal laws exiſting to reſtrain exceſs in apparel, chiefly made in the reigns of Edward III. IV. and Henry VIII. a ſpecimen of which we have inſerted above. But all of them it appeared expedient to repeal at another period. Indeed, although luxury will of neceſſity increaſe according to the influx of wealth, it may not be for the general benefit of commerce to impoſe, as in the above cited laws, an abſolute prohibition of every degree of it: yet, for the good of the public, it may be neceſſary that ſuch as go beyond proper bounds in eating, drinking, and wearing, what by no means is ſuitable to their ſtation, ſhould be taxed accordingly, could it be done without including thoſe who have a better title to ſuch indulgence. This is certainly, however, a point which ſhould be maturely weighed before executed; and, in mercantile countries at leaſt, ſuch reſtraints may be found prejudicial, moſt likely impracticable, eſpecially where true liberty is eſtabliſhed. Sir William Temple obſerves, ſpeaking of the trade and riches, and at the ſame time of the *frugality* of the Hollanders, "That ſome of our maxims are not ſo *certain* as *current* in politics: as that encouragement of exceſs and luxury if employed in the conſumption of *native* commodities, is of advantage to trade. It may be ſo to that which impoveriſhes, but not to that which enriches a country. It is indeed leſs prejudicial, if it lies in *native* than in *foreign* wares: but the humour of *luxury* and expence cannot ſtop at certain bounds; what begins in *native* will proceed to *foreign* commodities; and though the example ariſe among idle perſons, yet the imitation will run into all degrees, even of thoſe men by whoſe induſtry the nation ſubſiſts. And beſides, the more of *our own* we ſpend, the leſs ſhall we have to ſend abroad; and ſo it will come to paſs, that while we drive a vaſt trade, yet, by buying much more than we *ſell*, we ſhall come to be poor at laſt."

LYBIA, or Libya, a name anciently given to all that part of Africa lying between the border of Egypt and the river Triton; and comprehending *Cyrenaica*, *Marmarica*, and the Regio *Syrtica*. See theſe articles.

LYCÆUM, Λυκειον, in antiquity, the name of a celebrated ſchool or academy at Athens, where Ariſtotle explained his philoſophy. The place was compoſed of porticoes and trees planted in the quincunx form, where the philoſophers diſputed walking. Hence *philoſophy of the Lycæum* is uſed to ſignify the philoſophy of Ariſtotle, or the Peripatetic philoſophy. Suidas obſerves, that the Lycæum took its name from its having been originally a temple of Apollo Lycæus; or rather a portico or gallery built by Lycæus ſon of Apollo; but others mention it to have been built by Piſiſtratus or Pericles.

LYCÆUS, in *Ancient Geography*, a mountain of Arcadia, ſacred to Jupiter; whence *Jupiter Lycæus* (Pliny). Sacred alſo to Pan (Virgil); and hence *Lycæa*, the rites performed to Pan on this mountain; which Evander carrying with him to Latium, were called *Lupercalia* (Virgil).

LYCAON, in fabulous hiſtory, the firſt king of Arcadia, ſon of Pelaſgus and Melibœa. He built a town called Lycoſura, on the top of Mount Lycæus, in honour of Jupiter. He had many wives, by whom he had a daughter called Calliſto, and 50 ſons. He was ſucceeded on the throne by Nyctimus, the eldeſt of his ſons. He lived about 1820 years before the Chriſtian era.—Another king of Arcadia, celebrated for his cruelties. He was changed into a wolf by Jupiter, becauſe he offered human victims on the altar of the god Pan. Some attribute this metamorphoſis to another cauſe. The ſins of mankind, as they relate, were become ſo enormous, that Jupiter viſited the earth to puniſh wickedneſs and impiety. He came to Arcadia, where he was announced as a god, and the people began to pay proper adoration to his divinity. Lycaon, however, who uſed to ſacrifice all ſtrangers to his wanton cruelty, laughed at the pious prayers of his ſubjects; and to try the divinity of the god, he ſerved up human fleſh on his table. This impiety ſo irritated Jupiter, that he immediately deſtroyed the houſe of Lycaon, and changed him into a wolf.

LYCAONIA, in *Ancient Geography*, a ſmall country of the Hither Aſia, contained between Pamphylia to the ſouth, Cappadocia to the north, Piſidia and Phrygia to the weſt, and Armenia Minor to the eaſt. *Lycaones*, the people. This country, though ſituated very near Mount Taurus, and part of it on it, yet the Romans reckoned it in Aſia intra Taurum. *Arcadia*, anciently called *Lycaonia* (Stephanus). —Alſo an iſland in the Tiber, joined to Rome by a bridge, and to the land by another, namely, the Ceſtius and Fabricius.

LYCHNIS, campion, including alſo the *Batchelor's-button*, *Catch-fly*, &c.; a genus of plants belonging to the pentandria claſs; and in the natural method ranking under the 22d order, *Caryophyllæ*. See Botany *Index*.

LYCIA, a country of Aſia Minor, bounded by the Mediterranean on the ſouth, Caria on the weſt, Pamphylia on the eaſt, and Phrygia on the north. It was anciently called *Milyas* and *Tremile*, from the Milyæ, or Solymi, a people of Crete, who came to ſettle there. The country received the name of *Lycia* from Lycus the ſon of Pandion, who eſtabliſhed himſelf there. The inhabitants have been greatly commended by all the ancients for their ſobriety and juſtice. They were conquered by Crœſus king of Lydia, and afterwards by Cyrus. Though they were ſubject to the power of Perſia, yet they were governed by their own kings, and only paid a yearly tribute to the Perſian monarch. They became part of the Macedonian empire when Alexander came into the eaſt, and afterwards were ceded to the houſe of the Seleucidæ. The country was reduced into a Roman province by the emperor Claudius.

LYCIUM, a genus of plants belonging to the pentandria claſs; and in the natural method ranking under the 28th order, *Luridæ*. See Botany *Index*.

LYCODONTES, the petrified teeth of the lupuspiſcis, or wolf-fiſh, frequently found foſſile. They are of different ſhapes; but the moſt common kind riſe into a ſemiorbicular form, and are hollow within, ſomewhat reſembling an acorn-cup; this hollow is found ſometimes empty, and ſometimes filled with the ſtratum in which it is immerſed. Many of them have an outer circle, of a different colour from the reſt.

LYCOMEDES, in fabulous hiſtory, a king of Scyros, an iſland in the Ægean ſea. He was ſon of Apollo and Parthenope. He was ſecretly intruſted with the care of young Achilles, whom his mother Thetis had diſguiſed in woman's clothes, to remove him from the Trojan war, where ſhe knew he muſt unavoidably periſh. Lycomedes has rendered himſelf famous for his treachery to Theſeus, who had implored his protection

Lycomedes ‖ Lycurgus.

when driven from his throne of Athens by the usurper Mnestheus. Lycomedes, as it is reported, either envious of the fame of his illustrious guest, or bribed by the emissaries of Mnestheus, led Theseus to an elevated place, on pretence to show him the extent of his dominions, and perfidiously threw him down a precipice, where he was killed.

LYCOPERDON, a genus of plants belonging to the cryptogamia class. See Botany *Index*.

LYCOPERSICON. See Solanum, Botany *Index*.

LYCOPHRON, a famous Greek poet and grammarian, born at Colchis in Eubœa, flouriſhed about 304 B. C. and, according to Ovid, was killed by an arrow. He wrote 20 tragedies; but all his works are loſt, except a poem entitled *Caſſandra*, which contains a long train of predictions, which he ſuppoſes to have been made by Caſſandra, Priam's daughter. This poem is extremely obſcure. The beſt edition of it is that of Dr Potter, printed at Oxford in 1697, folio.

LYCOPODIUM, or Club-moss; a genus of plants belonging to the cryptogamia claſs. See Botany *Index*.

LYCOPOLIS, or Lycon, in *Ancient Geography*, ſo called from the worſhip of wolves. *Lycopolitæ*, the people; *Lycopolites*, the diſtrict. There were two towns of this name, one in the Delta, or Lower Egypt, near the Mediterranean; the other in the Thebais, or Higher Egypt, in the northern part, to the weſt of the Nile.

LYCOPSIS, a genus of plants belonging to the pentandria claſs; and in the natural method ranking under the 41ſt order, *Aſperifoliæ*. See Botany *Index*.

LYCOPUS, a genus of plants belonging to the diandria claſs; and in the natural method ranking under the 42d order, *Verticillatæ*. See Botany *Index*.

LYCURGIA, a feſtival obſerved by the Spartans, in memory of their lawgiver Lycurgus, whom they honoured with a temple and anniverſary ſacrifice.

LYCURGUS, the celebrated legiſlator of the Spartans, was the ſon of Eunomes king of Sparta.——He travelled to Greece, to the iſle of Crete, to Egypt, and even to the Indies, to converſe with the ſages and learned men of thoſe countries, and to learn their manners, their cuſtoms, and their laws. After the death of his brother Polydectes, who was king of Sparta, his widow offered the crown to Lycurgus, promiſing that ſhe would make herſelf miſcarry of the child of which ſhe was pregnant, provided he would marry her; but Lycurgus nobly refuſed theſe advantageous offers, and afterwards contented himſelf with being tutor to his nephew Charillus, and reſtored to him the government when he came of age; but notwithſtanding this regular and generous conduct, he was accuſed of a deſign to uſurp the crown. This calumny obliged him to retire to the iſland of Crete, where he applied himſelf to the ſtudy of the laws and cuſtoms of nations. At his return to Lacedemon, he reformed the government: and, to prevent the diſorders occaſioned by luxury and the love of riches, he prohibited the uſe of gold and ſilver; placed all the citizens in a ſtate of equality; and introduced the ſtricteſt temperance, the moſt exact diſcipline, and thoſe admirable laws which (a few exceptions) have been celebrated by all hiſtorians. It is ſaid, that, to engage the Lacedemonians to obſerve them inviolably, he made them promiſe with an oath not to change any part of them till his return; and that he afterwards went to the iſland of Crete, where he killed himſelf, after having ordered that his aſhes ſhould be thrown into the ſea, for fear leaſt if his body ſhould be carried to Sparta the Lacedemonians would think themſelves abſolved from their oath. He flouriſhed about 870 B. C.

Lydd ‖ Lydia.

LYDD, a town of England, in Kent, two miles and a half ſouth-weſt of Romney, of which town and port it is a member, and 71 miles from London. It is a populous town, and is incorporated by the name of a bailiff, jurats, and commonalty. In the beach near Stone-end, is a heap of ſtones, fancied to be the tomb of Criſpin and Criſpianus; and near the ſea is a place called *Holmſtone*, conſiſting of beach and pebble-ſtones, which abounds with holm trees.

LYDGATE, John, called the *Monk of Bury*; not, as Cibber conjectures, becauſe he was a native of that place, for he was born about the year 1380, in the village of Lydgate: but becauſe he was a monk of the Benedictine convent at St Edmund's-Bury. After ſtudying ſome time in our Engliſh univerſities, he travelled to France and Italy: and, having acquired a competent knowledge of the languages of thoſe countries, he returned to London, where he opened a ſchool, in which he inſtructed the ſons of the nobility in polite literature. At what time he retired to the convent of St Edmund's-Bury, does not appear; but he was certainly there in 1415. He was living in 1446, aged about 66; but in what year he died is not known. Lydgate, according to Pits, was an elegant poet, a perſuaſive rhetorician, an expert mathematician, an acute philoſopher, and a tolerable divine. He was a voluminous writer; and, conſidering the age in which he lived, an excellent poet. His language is leſs obſolete, and his verſification much more harmonious, than the language and verſification of Chaucer, who wrote about half a century before him. He wrote, 1. Hiſtory of the Theban war, printed at the end of Chaucer's works, 1561, 1602, 1687. 2. Poemation of good counſel; at the end of Chaucer's works. 3. The life of Hector; London 1594, folio, printed by Groſs, dedicated to Henry V. 4. Life of the Bleſſed Virgin; printed by Caxton. 5. The proverbs of Lydgate upon the fall of princes; printed by Wink. Word. London, 4to. 6. Diſpute of the horſe, the ſheep, and the gooſe; printed in Caxton's Collect. 4to. 7. The temple of braſs; among the works of Chaucer. 8. London lickpenny; vide Stow's hiſtory, &c. &c. Beſides an incredible number of other poems and tranſlations preſerved in various libraries, and of which the reader will find a catalogue in Biſhop Tanner.

LYDIA, in *Ancient Geography*, a celebrated kingdom of Aſia Minor.—All the ancient writers tell us, that Lydia was firſt called *Mæonia* or *Meonia*, from Meon king of Phrygia and Lydia; and that it was known under no other denomination till the reign of Atys, when it began to be called *Lydia* from his ſon Lydus. Bochart finding in his learned collection of Phœnician words the verb *luz*, ſignifying "to wind," and obſerving that the country we are ſpeaking of is watered by the Mæander ſo famous for its windings, concludes that it was thence named *[illegible]* or *[illegible]*

As to the ancient name of Mæonia, he takes it to be a Greek tranſlation of the Phœnician word *lud;* wherein he agrees in ſome meaſure with Stephanus, who derives the name of Mæonia from Mæon the ancient name of the Mæander. Some take the word *mæonia* to be a tranſlation of a Hebrew word ſignifying "metal," becauſe that country, ſay they, was in former times enriched above any other with mines. Though Lydia and Mæonia are by moſt authors indifferently uſed for one and the ſame country, yet they are ſometimes diſtinguiſhed; that part where Mount Tmolus ſtood, watered by the Pactolus, being properly called *Mæonia;* and the other, lying on the coaſt, *Lydia*. This diſtinction is uſed by Homer, Callimachus, Dionyſius, and other ancient writers. In after ages, when the Ionians, who had planted a colony on the coaſt of the Egean ſea, began to make ſome figure, that part was called *Ionia*, and the name of *Lydia* given to the ancient Mæonia.—Lydia, according to Pliny, Ptolemy, and other ancient geographers, was bounded by Myſia Major on the north, by Caria on the ſouth, by Phrygia Major on the eaſt, and Ionia on the weſt, lying between the 37th and 39th degrees of north latitude. What the ancients ſtyle the kingdom of *Lydia* was not confined within theſe narrow boundaries, but extended from Halys to the Egean ſea. Pliny's deſcription includes Æolia, lying between the Hermus and the Caïcus.

As to the origin of the Lydians, Joſephus, and after him all the eccleſiaſtical writers, derive them from Lud, Shem's fourth ſon; but this opinion has no other foundation than the ſimilitude of names. Some of the ancients will have the Lydians to be a mixed colony of Phrygians, Myſians, and Carians. Others finding ſome conformity in religion and religious ceremonies between the Egyptians and Tuſcans who were a Lydian colony, conclude them, without any farther evidence, to be originally Egyptians. All we know for certain is, that the Lydians were a very ancient nation, as is manifeſt from their very fables; for Atys, Tantalus, Pelops, Niobe, and Arachne, are all ſaid to have been the children of Lydus. And Zanthus in his *Lydiaca*, quoted by Stephanus, informs us, that the ancient city of Aſcalon, one of the five ſatrapies of the Philiſtines, mentioned in the books of Joſhua and the Judges, was built by one Aſcalus a Lydian, whom Achiamus king of Lydia had appointed to command a body of troops which he ſent, we know not on what occaſion, into Syria. The Heraclidæ, or kings of Lydia deſcended from Hercules, began to reign before the Trojan war; and had been preceded by a long ſeries of ſovereigns ſprung from Atys, and hence ſtyled *Atyadæ;* a ſtrong proof of the antiquity of that kingdom.

The Lydians began very early to be ruled by kings, whoſe government ſeems to have been truly deſpotic, and the crown hereditary. We read of three diſtinct races of kings reigning over Lydia, viz. the Atyadæ, the Heraclidæ, and the Mermnadæ.

The *Atyadæ* were ſo called from Atys the ſon of Cotys, and grandſon of Manes the firſt Lydian king. But the hiſtory of this family is obſcure and fabulous.

The Atyadæ were ſucceeded by the *Heraclidæ*, or the deſcendants of Hercules. For Hercules being, by the direction of the oracle, ſold as a ſlave to Omphale a queen of Lydia, to expiate the murder of Iphitus, had, during his captivity, by one of her ſlaves, a ſon named *Cleolaus*, whoſe grandſon Argon was the firſt of the Heraclidæ that aſcended the throne of Lydia. This race is ſaid to have reigned 505 years, the ſon ſucceeding the father for 22 generations. They began to reign about the time of the Trojan war. The laſt of the family was the unhappy Candaules, who loſt both his life and kingdom by his imprudence: An event of which we have the following account by Herodotus. Candaules had a wife whom he paſſionately loved, and believed the moſt beautiful of her ſex. He extolled her charms to Gyges his favourite, whom he uſed to intruſt with his moſt important affairs; and the more to convince him of her beauty, reſolved to ſhow her to him quite naked: he accordingly placed him in the porch of her chamber where the queen uſed to undreſs when ſhe went to bed, ordering him to retire after he ſhould have ſeen her, and take all poſſible care not to be obſerved. But notwithſtanding all the caution he could uſe, ſhe plainly diſcovered him going out; and though ſhe did not doubt but it was her huſband's contrivance, yet ſhe paſſed that night in a ſeeming tranquillity, ſuppreſſing her reſentment till next morning, when ſhe ſent for Gyges, and reſolutely told him that he muſt either by his death atone for the criminal action he had been guilty of, or put to death Candaules the contriver of it, and receive both her and the kingdom of Lydia for his reward. Gyges at firſt earneſtly begged of her that ſhe would not drive him to the neceſſity of ſuch a choice. But finding that he could not prevail with her, and that he muſt either kill his maſter or die himſelf, he choſe the former part of the alternative. Being led by the queen to the ſame place where her huſband had poſted him the night before, he ſtabbed the king while he was aſleep, married the queen, and took poſſeſſion of the kingdom, in which he was confirmed by the anſwer of the Delphic oracle. The Lydians having taken up arms to revenge the death of their prince, an agreement was made between them and the followers of Gyges, that if the oracle ſhould declare him to be lawful king of Lydia, he ſhould be permitted to reign; if not, he ſhould reſign the crown to the Heraclidæ. The anſwer of the oracle proving favourable to Gyges, he was univerſally acknowledged for lawful king of Lydia. Candaules is ſaid to have purchaſed a picture painted by Bularchas, repreſenting a battle of the Magnetes, for its weight in gold; a circumſtance which ſhows how early the art of painting began to be in requeſt, for Candaules was cotemporary with Romulus.

Gyges having thus poſſeſſed himſelf of the kingdom of Lydia, ſent many rich and valuable preſents to the oracle of Delphos, among others, ſix cups of gold weighing 30 talents, and greatly eſteemed for the workmanſhip. He made war on Miletus and Smyrna, took the city of Colophon, and ſubdued the whole country of Troas. In his reign, and by his permiſſion, the city of Abydus was built by the Mileſians. Plutarch and other writers relate his acceſſion to the crown of Lydia in a quite different manner, and tells us, without making any mention of the queen, that Gyges rebelled againſt Candaules and ſlew him in an engagement. In Gyges began the third race called *Mermnadæ;* who were alſo, properly ſpeaking, Heraclidæ, being deſcended from a ſon of Hercules by Omphale. Gyges reigned 38 years, and was ſucceeded by his ſon Ardyes.

This prince carried on the war againſt the Mileſians which his father had begun, and poſſeſſed himſelf of Priene, in thoſe days a ſtrong city. In his reign the Cimmerians invaded and overran all Aſia Minor; but what battles were fought between the Lydians and theſe invaders, and with what ſucceſs, we find no where mentioned. Herodotus only informs us, that in the time of Ardyes they poſſeſſed themſelves of Sardis, the metropolis of Lydia, but could never reduce the caſtle. Ardyes reigned 49 years, and was ſucceeded by his ſon Sadyattes, who reigned 12 years, and warred moſt part of his reign with the Mileſians.

After him came his ſon Alyattes, who for the ſpace of five years continued the war which his father had begun againſt the Mileſians, ravaging their country, and about harveſt time carrying away all their corn yearly, in order to oblige them, for want of proviſions, to ſurrender their city, which he knew he could not reduce any other way, the Mileſians being at that time maſters of the ſea. In the 12th year of this war the Lydians having ſet fire to the corn in the fields, the flames were carried by a violent wind, which happened to blow at that time, to the temple of Minerva at Aſſeſus, and burnt it down to the ground. Not long after, Alyattes falling ſick, ſent to conſult the oracle at Delphos; which refuſed to return any anſwer till ſuch time as the king ſhould rebuild the temple of Minerva at Aſſeſus. Alyattes, thus warned, deſpatched ambaſſadors to Miletus, enjoining them to conclude a truce with the Mileſians till the temple ſhould be rebuilt. On the arrival of the ambaſſadors, Thraſybulus, then king of Miletus, commanded all the corn that was at that time in the city to be brought into the market-place, ordering the citizens to banquet in public, and revel as if the city were plentifully ſtored with all manner of proviſions. This ſtratagem Thraſybulus practiſed, to the end that the ambaſſadors ſeeing ſuch quantities of corn, and the people everywhere diverting themſelves, might acquaint their maſter with their affluence, and divert him from purſuing the war. As Thraſybulus had deſigned, ſo it happened; for Alyattes, who believed the Mileſians greatly diſtreſſed for proviſions, receiving a different account from his ambaſſadors, changed the truce into a laſting peace, and ever afterwards lived in amity and friendſhip with Thraſybulus and the Mileſians. He was ſucceeded, after a reign of 57 years, by his ſon Crœſus, whoſe uninterrupted proſperity, in the firſt years of his reign, far eclipſed the glory of all his predeceſſors. He was the firſt that made war on the Epheſians, whoſe city he beſieged and took notwithſtanding their conſecrating it to Diana, and faſtening the walls by a rope to her temple, which was ſeven ſtadia diſtant from the city. After the reduction of Epheſus he attacked, under various pretences, the Ionians and Æolians, obliging them, and all the other Greek ſtates of Aſia, to pay him a yearly tribute. Having met with ſuch extraordinary ſucceſs by land, the Lydian prince determined to render his power equally conſpicuous by ſea. For this purpoſe he thought ſeriouſly of equipping a fleet; with which he purpoſed to invade and conquer the Grecian iſlands directly fronting his dominions. But this deſign, which, conſidering the ſlow progreſs in maritime power among the nations moſt diligent to attain it, would probably have [illegible] of ſucceſs, was prevented by the advice of a philo[illegible] ed traveller conveyed in ſuch a lively turn of wit, as eaſily changed the reſolution of the king. Bias of Priene in Ionia, ſome ſay Pittacus of Mitylene in the iſle of Leſbos, while he travelled after the Grecian cuſtom, from curioſity and a love of knowledge, was preſented to Crœſus at the Lydian court; and being aſked by that prince what news from Greece; he anſwered with a republican freedom, that the iſlanders had collected powerful ſquadrons of cavalry with an intention of invading Lydia. "May the gods grant (ſaid Crœſus), that the Greeks, who are unacquainted with horſemanſhip, ſhould attack the diſciplined valour of the Lydian cavalry; there would ſoon be an end to the conteſt." "In the ſame manner (replied Bias), as if the Lydians, who are totally unexperienced in naval affairs, ſhould invade the Grecians by ſea." Struck by the acuteneſs of this unexpected obſervation, Crœſus deſiſted from his intended expedition againſt the iſlands, and inſtead of employing new means for extending his conqueſts, determined peaceably to enjoy the laurels which he had won, and to diſplay the grandeur which he had attained. But his happineſs was ſoon after allayed by the death of his favourite ſon Atys, who was unfortunately killed at the chaſe of a wild boar. For this loſs he continued diſconſolate for two years and in a ſtate of inaction, till the conqueſts of Cyrus, and growing power of the Perſians, rouſed up his martial ſpirit, and diverted his mind to other thoughts. He apprehended that the ſucceſs which attended Cyrus in all his undertakings, might at laſt prove dangerous to himſelf, and therefore reſolved to put a ſtop, if poſſible, to his progreſs. In taking this reſolution, which might probably be attended with the moſt important conſequences, he was deſirous to learn the will of heaven concerning the iſſue of the war. The principal oracles which he conſulted were thoſe of Branchis in Ionia, of Hammon in Libya, and of Delphi in Greece. Among theſe reſpected ſhrines, the oracle of Delphi maintained its aſcendant, as the moſt faithful interpreter of fate. Crœſus was fully perſuaded of its veracity; and deſirous generouſly to compenſate for the trouble which he had already given, and ſtill meant to give, the prieſts of Apollo, he ſacrificed 3000 oxen to the god, and adorned his ſhrine with dedications equally valuable for the workmanſhip and for the materials; precious veſſels of ſilver, ewers of iron beautifully inlaid and enamelled; various ornaments of pure gold, particularly a golden lion weighing ten talents, and a female figure three cubits or near five feet high. In return for theſe magnificent preſents, the oracle, in ambiguous language, flattered Crœſus with obtaining an eaſy victory over his enemies, and with enjoying a long life and a proſperous reign. The god at the ſame time enjoined him to contract an alliance with the moſt powerful of the Grecian ſtates.

Elevated with theſe favourable predictions of Apollo, Crœſus prepared to yield a ready obedience to the only condition required on his part for the accompliſhment of his aſpiring purpoſe. Not deeming himſelf ſufficiently acquainted with the affairs of Greece, to know what particular republic was meant by the oracle, he made particular inquiry of their beſt informed concerning the ſtate of Europe; and diſcovered, that among all the members of the Grecian confederacy, the Athenians and Lacedemonians were juſtly entitled to the pre-eminence. In order to learn which of theſe communities deſerved the epithet of *moſt powerful*, it was neceſſary to ſend ambaſſadors into Greece. The Lydians deſpatched with this important commiſſion, ſoon diſcovered that the Athenians after having been long haraſſed by internal diſſenſions, were actually governed by the tyrant Piſiſtratus. The Spartans, on the other hand, though anciently the worſt regulated of all the Grecian communities, had enjoyed domeſtic peace and foreign proſperity ever ſince they had adopted the wiſe inſtitutions of Lycurgus. After that memorable period, they had repeatedly conquered the warlike Argives, triumphed over the hardy Arcadians; and notwithſtanding the heroic exploits of Ariſtomenes, ſubdued and enſlaved their unfortunate rivals of Meſſene. To the Lydian ambaſſadors therefore, the Spartan republic appeared to be pointed out by the oracle as the community whoſe alliance they were enjoined to ſolicit. Having repaired accordingly to Sparta, they were introduced not only to the kings and ſenate, but, as the importance of the negociation required, to the general aſſembly of the Lacedemonians, to whom they, in few words, declared the object of their commiſſion; "We are ſent, O Lacedemonians! by Crœſus, king of the Lydians and of many other nations, who being commanded by the oracle of Apollo to ſeek the friendſhip of the moſt powerful people of Greece, now ſummons you, who juſtly merit that epithet, to become his faithful allies, in obedience to the will of the god whoſe authority you acknowledge." The Lacedemonians, pleaſed with the alliance of a warlike king, and ſtill more with the fame of their valour, readily accepted the propoſal. To the ſtrict connexion of an offenſive and defenſive league, they joined the more reſpected ties of ſacred hoſpitality. A few years before this tranſaction, they had ſent to purchaſe gold at Sardis for making a ſtatue of Apollo. Crœſus had on that occaſion gratuitouſly ſupplied their want. Remembering this generoſity, they gave the Lydian ambaſſadors at their departure, as a preſent for their maſter, a veſſel of braſs containing 300 amphoras (above 12 hogſheads), and beautifully carved on the outſide with various forms of animals.

Crœſus, having thus happily accompliſhed the deſign recommended by the oracle, was eager to ſet out upon his intended expedition. He had formerly entered into alliance with Amaſis king of Egypt, and Labynetus king of Babylon. He had now obtained the friendſhip of the moſt warlike nation of Europe. The newly raiſed power of Cyrus and the Perſians ſeemed incapable of reſiſting ſuch a formidable confederacy.

Elevated with theſe flattering ideas of his own invincible greatneſs, Crœſus waited not to attack the Perſian dominions until he had collected the ſtrength of his allies. The ſanguine impetuoſity of his temper, unexperienced in adverſity, unfortunately precipitated him into meaſures no leſs ruinous than daring. Attended only by the arms of Lydia, and a numerous band of mercenaries, whom his immenſe wealth enabled him at any time to call into his ſervice, he marched towards the river Halys; and having croſſed with much difficulty that deep and broad ſtream, entered the province of Cappadocia, which formed the weſtern frontier of the Median dominions. That unfortunate country ſoon experienced all the calamities of invaſion. The Pterian plain, the moſt beautiful and the moſt fertile diſtrict of Cappadocia, was laid waſte; the ports of the Euxine, as well as ſeveral inland cities, were plundered; and the inoffenſive inhabitants were either put to the ſword or dragged into captivity. Encouraged by the unreſiſting ſoftneſs of the natives of thoſe parts, Crœſus was eager to puſh forwards; and if Cyrus did not previouſly meet him in the field, he had determined to proceed in triumph to the mountains of Perſia. Againſt this dangerous reſolution he was in vain exhorted by a Lydian named Sandanis; who, when aſked his opinion of the war, declared it with that freedom which the princes of the eaſt have in every age permitted, amidſt all the pride and caprices of deſpotic power, to men diſtinguiſhed by the gifts of nature or education. "You are preparing, O king, to march againſt a people who lead a laborious and a miſerable life; whoſe daily ſubſiſtence is often denied them, and is always ſcanty and precarious; who drink only water, and who are clothed with the ſkins of wild beaſts. What can the Lydians gain by the conqueſt of Perſia; they who enjoy all the advantages of which the Perſians are deſtitute? For my part, I deem it a bleſſing of the gods, that they have not excited the warlike poverty of theſe miſerable barbarians to invade and plunder the luxurious wealth of Lydia." The moderation of this advice was rejected by the fatal preſumption of Crœſus; who confounding the dictates of experienced wiſdom with the mean ſuggeſtions of puſillanimity, diſmiſſed the counſellor with contempt.

Meanwhile, the approach of Cyrus, who was not of a temper to permit his dominions to be ravaged with impunity, afforded the Lydian king an opportunity of bringing the war to a more ſpeedy iſſue than by his intended expedition into Perſia. The army of Cyrus gradually augmented on his march: the tributary princes cheerfully contributing with their united ſtrength towards the aſſiſtance of a maſter whoſe valour and generoſity they admired, and who now took arms to protect the ſafety of his ſubjects, as well as to ſupport the grandeur of his throne. Such was the rapidity of his movement, eſpecially after being informed of the deſtructive ravages of the enemy in Cappadocia, that he arrived from the ſhores of the Caſpian to thoſe of the Euxine ſea before the army of Crœſus had provided the neceſſaries for their journey. That prince, when appriſed of the neighbourhood of the Perſians, encamped on the Pterian plain; Cyrus likewiſe encamped at no great diſtance; frequent ſkirmiſhes happened between the light troops; and at length a general engagement was fought with equal fury and perſeverance, and only terminated by the darkneſs of night. The loſs on both ſides hindered a renewal of the battle. The numbers, as well as the courage of the Perſians, much exceeded the expectation of Crœſus. As they diſcovered not any intention to haraſs his retreat, he determined to move back towards Sardis, to ſpend the winter in the amuſements of his pa-

Lydia. lace; and after ſummoning his numerous allies to his ſtandard, to take the field early in the ſpring with ſuch increaſe of force as ſeemed ſufficient to overpower the Perſians.

But this deſign was defeated by the careful vigilance of Cyrus. That experienced leader allowed the enemy to retire without moleſtation; carefully informing himſelf of every ſtep which they took, and of every meaſure which they ſeemed determined to purſue. Patiently watching the opportunity of a juſt revenge, he waited until Crœſus had re-entered his capital, and had diſbanded the foreign mercenaries, who compoſed the moſt numerous diviſion of his army. It then ſeemed the proper time for Cyrus to put his Perſians in motion; and ſuch was his celerity, that he brought the firſt news of his own arrival in the plain of Sardis. Crœſus, whoſe firmneſs might well have been ſhaken by the imminence of this unforeſeen danger, was not wanting on the preſent occaſion to the duties which he owed to his fame and the luſtre of the Lydian throne. Though his mercenaries were diſbanded, his own ſubjects, who ſerved him from attachment, who had been long accuſtomed to victory, and who were animated with a high ſenſe of national honour, burned with a deſire of enjoying an opportunity to check the daring inſolence of the invaders. Crœſus indulged and encouraged this generous ardour. The Lydians in that age fought on horſeback, armed with long ſpears; the ſtrength of the Perſians conſiſted in infantry. They were ſo little accuſtomed to the uſe of horſes, that camels were almoſt the only animals which they employed as beaſts of burden. This circumſtance ſuggeſted to a Mede, by name Harpagus, a ſtratagem, which being communicated to Cyrus, was immediately adopted with approbation by that prince. Harpagus, having obſerved that horſes had a ſtrong averſion to the ſhape and ſmell of camels, adviſed the Perſian army to be drawn up in the following order: All the camels which had been employed to carry baggage and proviſions were collected into one body, arranged in a long line fronting the Lydian cavalry. The foot ſoldiers of the Perſians were poſted immediately behind the line, and placed at a due diſtance. The Median horſe (for a few ſquadrons of theſe followed the ſtandard of Cyrus) formed the rear of the army. As the troops on both ſides approached to join battle, the Lydian cavalry, terrified at the unuſual appearance of the camels, mounted with men in arms, were thrown into diſorder, and turning their heads, endeavoured to eſcape from the field. Crœſus, who perceived the confuſion, was ready to deſpair of his fortune; but the Lydians, abandoning their horſes, prepared with uncommon bravery to attack the enemy on foot. Their courage deſerved a better fate; but unaccuſtomed as they were to this mode of fighting, they were received and repelled by the experienced valour of the Perſian infantry, and obliged to take refuge within the fortified ſtrength of Sardis, where they imagined themſelves ſecure. The walls of that city bid defiance to the rude art of attack, as then practiſed by the moſt warlike nations. If the Perſian army ſhould inveſt it, the Lydians were provided with proviſions for ſeveral years; and there was reaſon to expect, that in a few months, and even weeks, they would receive ſuch aſſiſtance from Egypt, Babylonia, and Greece (to which countries they had already ſent ambaſſadors), as would oblige the Perſians to raiſe the ſiege. Lydia

The Lydian miniſters deſpatched into Greece met with great ſympathy from the Spartans. That people were particularly obſervant of the faith of treaties; and while they puniſhed their enemies with unexampled ſeverity, they behaved with generous compaſſion towards thoſe whom they had once accepted for allies. They immediately reſolved therefore to ſend him a ſpeedy and effectual relief; and for this purpoſe aſſembled their troops, made ready their veſſels, and prepared every thing neceſſary for the expedition.

The valour of the Spartans might perhaps have upheld the ſinking empire of Lydia; but before their armament could ſet ſail, Crœſus was no longer a ſovereign. Notwithſtanding the ſtrength of Sardis, that city had been taken by ſtorm on the 20th day of the ſiege; the walls having been ſcaled in a quarter, which, appearing altogether inacceſſible, was too careleſsly guarded. This was effected by the enterpriſe of Hyreades a Mede, who accidentally obſerved a centinel deſcend part of the rock in order to recover his helmet. Hyreades was a native of the mountainous province of Mardia, and being accuſtomed to clamber over the dangerous precipices of his native country, reſolved to try his activity in paſſing the rock upon which he had diſcovered the Lydian. The deſign was more eaſily accompliſhed than he had reaſon to expect: emulation and ſucceſs encouraged the braveſt of the Perſians to follow his example; theſe were ſupported by greater numbers of their countrymen; the garriſon of Sardis was ſurpriſed; the citadel ſtormed; the rich capital of Lower Aſia ſubjected to the vengeful rapacity of an indignant victor. Thus ended the ancient kingdom of Lydia, which continued ſubject to the Perſians till they alſo were conquered by the Macedonians. For the fate of the Lydian monarch, ſee the article Croesus.

Lydiat. **LYDIAT**, Thomas, a learned Engliſh divine, born in 1572, and educated at Oxford. About the year 1609, he became acquainted with Dr James Uſher, afterwards archbiſhop of Armagh, who carried him to Ireland. He was at Dublin college for about two years, after which he returned to England; and the rectory of Alkrington becoming vacant, he was preſented to it: but at length, being engaged for the debts of a near relation, which for the preſent he was unable to pay, having before ſpent his patrimony in printing ſeveral books, he was ſent to priſon; and was confined at Oxford, in the King's Bench, and elſewhere, till Sir William Boſwell, a generous patron of learned men, Dr Robert Pink, warden of New college, Biſhop Uſher, and Dr Laud diſcharged the debt. In the civil wars, he ſuffered much in his rectory of Alkrington from the parliament party; was four times pillaged to the value of at leaſt 70l.; and was forced for a quarter of a year together to borrow a ſhirt to ſhift himſelf. He died in 1646. He wrote ſome pieces in Engliſh, and many works in Latin, on chronology and natural hiſtory.

LYDIUS Lapis, in the natural hiſtory of the ancients; the name of the ſtone uſed by way of touchſtone for the trial of gold and ſilver, and called by ſome *Heraclius lapis*; both of which names were alſo applied by the ancients to the loadſtone; and hence has ariſen no ſmall miſunderſtanding of their works. Pliny has obſerved, that both the loadſtone and touchſtone were at times called *Lydius* and *Heraclius lapis*.

The true *lapis Lydius*, or the touchſtone, was anciently found only in the river Tmolus; but was afterwards found in many other places, and is now very common in many of the German rivers. The ancients give us very remarkable and circumſtantial accounts of the uſes they made of it; and it is plain they were able to diſcern the alloys of gold by means of it with very great exactneſs. We at preſent uſe ſeveral different ſtones under this name, and for the ſame purpoſe. In Italy, a green marble called *verdello*, is moſt frequently uſed; and with us, very frequently ſmall pieces of *baſalt*.

LYGEUM, a genus of plants belonging to the triandria claſs; and in the natural method ranking under the fourth order, *Gramina*. See BOTANY *Index*.

LYGII, LIGII, *Lugii*, or *Logiones*, in *Ancient Geography*, a people of Germany, to the weſt of the Viſtula, where it forms a bend like a creſcent; *Ligii*, (Dio); *Lugii*, (Strabo); *Logiones*, (Zoſimus). Their name *Lugii* is conjectured to be derived from their mutually cloſe confederacy or league. The Viſtula was their boundary to the north, eaſt, and ſouth, with Mount Aſciburgius to the weſt. Now the whole of that country lies in Poland, on this ſide the Viſtula.

LYING-IN WOMEN. See MIDWIFERY.

Lying to, or *Lying-by*, the ſituation of a ſhip, when ſhe is retarded in her courſe, by arranging the ſails in ſuch a manner as to counteract each other with nearly an equal effort, and render the ſhip almoſt immoveable, with reſpect to her progreſſive motion, or headway. A ſhip is uſually brought-to by the main and fore top ſails, one of which is laid aback, whilſt the other is full; ſo that the latter puſhes the ſhip forward, whilſt the former reſiſts this impulſe, by forcing her aſtern. This is particularly practiſed in a general engagement, when hoſtile fleets are drawn up in two lines of battle oppoſite each other. It is alſo uſed to wait for ſome other ſhip, either approaching or expected; or to avoid purſuing a dangerous courſe, eſpecially in dark or foggy weather.

LYME-REGIS, a ſea port town of Dorſetſhire in England, 148 miles from London. It lies near the ſea, on the very borders of Devonſhire, in a cavity between two rocky hills, which makes it difficult of acceſs. It is about five furlongs long, and contains about 200 houſes. As it lies on the declivity of a hill, the houſes make a good ſhow, one above another; and ſome of them are built of freeſtone, and covered with blue ſlate. The corporation conſiſts of a mayor (who is juſtice of peace during his mayoralty and the year after, and in the third year both juſtice and coroner), a recorder, 15 capital burgeſſes, and a town clerk. This place had formerly a very flouriſhing trade to France, Spain, the Straits, Newfoundland, and the Weſt Indies; during which, the cuſtoms amounted ſome years to 16,000l. But it ſtands on ſuch a high ſteep rock, that the merchants are obliged to load and unload their goods at a place a quarter of a mile off, called the *Cobb*, originally built in the reign of Edward III. which coſts a great ſum to maintain, but forms ſuch a harbour as perhaps is not to be equalled in the world, the ſhips being ſheltered by a high thick ſtone wall, raiſed in the main ſea a good way from the ſhore, broad enough for carriages and warehouſes, and the cuſtomhouſe officers have one upon it. The cellars of the low part of the town, near the ſea, are however often overflowed by the ſpring tides 10 or 12 feet. There are guns planted for defence both of the Cobb and the town, the ſhore here being very proper for batteries. The cuſtomhouſe ſtands on pillars, with the corn market under it. There is an alms-houſe in Church-ſtreet, alſo Preſbyterian and Anabaptiſt meeting-houſes. The town hall is near Broad-ſtreet. The church ſtands at the eaſt end of the town on a riſing ground. The market here is Friday, and there are two fairs in the year. We read, that in 774, the Saxon king Kinwulf gave land hereabouts to the church of Sherborn, for the boiling of ſalt there to ſupply its neceſſities. At this place the duke of Monmouth landed in 1685. A few years ago above 2000l. worth of gold and ſilver coin of Char. I. and II. were diſcovered by ſome labourers.

LYMINGTON, a borough town of Hampſhire in England, 97 miles ſouth-weſt of London. It ſtands about a mile from the channel running between the main land and the iſle of Wight; and has a harbour for veſſels of conſiderable burden. The tide flows near a mile above the town. It has a market on Saturdays, and two fairs in the year: and ſends two members to parliament.

LYMPH, a fine colourleſs fluid, ſeparated in the body from the maſs of blood, and contained in peculiar veſſels called *lymphatics*. See ANATOMY.

LYMPHÆA, were artificial caves or grottos amongſt the Romans, furniſhed with a great many tubes, canals, and various hydraulic apparatus, through which the water guſhed out upon the ſpectators unexpectedly whilſt they were admiring the beautiful arrangement of the ſhell-work in the grotto.

LYMPHATI, was a name given by the Romans to ſuch as were ſeized with madneſs. It is ſuppoſed to be uſed for *Nymphati*, becauſe the ancients imagined that every perſon who had the misfortune to ſee a Nymph was inſtantly ſtruck with phrenzy. *Lymphati* may indeed ſignify "madmen," as derived from *lympha*, "water," over which element the Nymphs were thought to preſide: But it appears moſt likely, that diſtracted people were called *lymphati*, from the circumſtance of madmen's being affected with the *hydrophobia* or dread of water after the bite of a mad dog; for this peculiarity, in caſes of canine madneſs, was not unknown to the Romans.

LYNCEUS, in fabulous hiſtory, one of the 50 ſons of Ægeus, married Hypermneſtra, one of the 50 daughters of Danaus. See HYPERMNESTRA.

LYNCEUS, in fabulous hiſtory, one of the Argonauts, who went with Jaſon in the expedition to obtain the golden fleece. He was of great uſe to the Argonauts, by enabling them to avoid the ſand banks and rocks they found in their way. The poets ſay, that Lynceus had ſo piercing a ſight, that it could not only penetrate to the bottom of the ſea, but even to hell. Some mythologiſts ſuppoſe, that this fable is taken from Lynceus's ſkill in obſerving the ſtars, and diſcovering the mines of gold and ſilver concealed in the earth.

LYNCURIUM, a ſtone thought to be the ſame with the tourmalin. The name is derived from λυγξ, "lynx," and ȣρον, "urine."

LYNCURIUS LAPIS, a ſtone capable of producing muſhrooms.

In the Ephemerides of the Curious, we find mention made of a ſtone, ſo called by Dr John George Wolckamerus, who ſaw one in Italy, which never ceaſes to produce in a few days muſhrooms of an excellent flavour by the moſt ſimple and eaſy proceſs imaginable. "It is (ſays he) of the bigneſs of an ox's head, rough and uneven on its ſurface, and on which alſo are perceived ſome clefts and crevices. It is black in ſome parts, and in others of a lighter and grayiſh colour. Internally it is porous, and nearly of the nature of the pumice-ſtone, but much heavier; and it contains a ſmall piece of flint, which is ſo incorporated with it as to appear to have been formed at the ſame time the ſtone itſelf received its form. This gives room to judge, that thoſe ſtones have been produced by a fat and viſcid juice, which has the property of indurating whatever matter it filtrates into. The ſtone here ſpoken of, when it has been lightly covered with earth, and ſprinkled with warm water, produces muſhrooms of an exquiſite flavour, which are uſually round, ſometimes oval, and whoſe borders, by their inflexions and different curvities, repreſent in ſome meaſure human ears. The principal colour of theſe muſhrooms is ſometimes yellowiſh, and ſometimes of a bright purple; but they are always diſſeminated with different ſpots, of a deep orange colour, or red brown; and when theſe ſpots are recent, and ſtill in full bloom, they produce a very agreeable effect to the ſight. But what appears admirable is, that the part of the ſtalk which remains adhering to the ſtone, when the muſhroom has been ſeparated from it, grows gradually hard, and petrifies in time, ſo that it ſeems that this fungites reſtores to the ſtone the nutritive juice it received from it, and that it thus contributes to its increaſe." John Baptiſt Porta pretends, that this ſtone is found in ſeveral parts of Italy; and that it is not only to be met with at Naples, taken out of Mount Veſuvius, but alſo on Mount Pantherico, in the principality of Arellino; on Mount Garganus, in Apulia; and on the ſummits of ſome other very high mountains. He adds, that the muſhrooms which grow on thoſe ſorts of ſtones, and are uſually called *fungi lyncurii*, have the property of diſſolving and breaking the ſtone of the kidneys and bladder; and that, for this purpoſe, nothing more is required than to dry them in the ſhade, and being reduced to powder, to make the patient, faſting, take a ſufficient quantity of this powder in a glaſs of white wine, which will ſo cleanſe the excretory ducts of the urine, that no ſtones will ever after be collected in them. As to the form of thoſe muſhrooms, their root is ſtony, uneven, divided according to its longitudinal direction, and compoſed of fibres as fine as hairs, interwoven one with another. Their form, on firſt ſhooting out, reſembles a ſmall bladder, ſcarce then larger than the bud of a vine; and if in this ſtate they are ſqueezed between the fingers, an aqueous ſubacid liquor iſſues out. When they are at their full growth, their pedicle is of a finger's length, larger at top than at bottom, and becomes inſenſibly ſlenderer in proportion as it is nearer the earth. Theſe muſhrooms are alſo formed in an umbella, and variegated with an infinity of little ſpecks ſituated very near one another. They are ſmooth and even on the upper part, but underneath leafy like the common muſhrooms. Their taſte is likewiſe very agreeable, and the ſick are not debarred eating of them when they have been dreſſed in a proper manner. Curioſity having prompted ſome naturaliſts and phyſicians to ſubmit theſe ſtones to a chemical analyſis, in order to be more competent judges of the uſes they might be put to in medicine, there firſt came forth, by diſtillation, an inſipid water, and afterwards a ſpirituous liquor. The retort having been heated to a certain point, there aroſe an oil, which had nearly the ſmell and taſte of that of guaiacum; and a very acrid ſalt was extracted from the aſhes.

LYNN-REGIS, a town of Norfolk, in England, diſtant 98 miles from London. It is a handſome, large, well-built place, and ſends two members to parliament. It was a borough by preſcription in 1295. King John, on account of its adherence to him againſt the barons, made it a free borough, with large privileges. He appointed it a provoſt, and gave it a large ſilver cup of 73 ounces doubly gilt and enamelled, and a large ſilver ſword that is carried before the mayor; though this laſt, according to ſome, is Henry VIII.'s ſword, which he gave to the town when it came into his hands by exchange with the biſhop of Norwich; after which it was called King's Lynn, whereas before it was Biſhop's Lynn. Henry III. made it a mayor town, for its ſerving him againſt the barons. It has had 15 royal charters; and is governed by a mayor, high-ſteward, under-ſteward, recorder, 12 aldermen, and 18 common-council men. It has two churches, beſides St Nicholas, a chapel of eaſe to St Margaret's, a Preſbyterian and a Quakers meeting-houſe, with a bridewell or workhouſe, and ſeveral alms-houſes, and a free ſchool. In September 1741 the ſpires of its two churches were both blown down by a ſtorm of wind; and that of St Margaret's, which was 193 feet in height, having beat in the body of the church, it has been ſince rebuilt, towards which King George II. gave 1000l. and the late earl of Orford, then Sir Robert Walpole, 500l. This church was formerly an abbey, and afterwards one of the largeſt pariſh-churches in England. The town-houſe, called Trinity-hall, is a noble old fabric; and ſo is the Exchange, which is of free-ſtone, with two orders of columns. St Nicholas's chapel is very ancient, and reckoned one of the faireſt and largeſt of the kind in England. It has a bell-tower of free-ſtone, and an octagonal ſpire over it, both which together are 170 feet from the ground. There is a library in it that was erected by ſubſcription; and there is another at St Margaret's. Here have been formerly ſeveral monaſteries; but the only fabric remaining that belongs to any religious order is the Gray-friars ſteeple, a noted ſea-mark. The ſituation of this town, near the fall of the Ouſe into the ſea, after having received ſeveral other rivers, of which ſome are navigable, gives it an opportunity of extending its trade into eight different counties; by which many conſiderable cities and towns, viz. Peterborough, Ely, Stamford, Bedford, St Ives, Huntingdon, St Neot's, Northampton, Cambridge, St Edmundſbury, and the north parts of Bucks, as well as the inland parts of Norfolk and Suffolk, are ſupplied with heavy goods, not only from our own produce, as coals and ſalt from Newcaſtle, but alſo of merchandiſe imported from abroad, eſpecially wine; of which two articles, viz. coals and wine, this is the greateſt port for importation of any place on all the eaſtern coaſt of England; and thoſe wherein the Lynn merchants deal more largely than any town in England, except London, Briſtol, and Newcaſtle. In return for this, Lynn receives back all the corn which the counties laſt mentioned produce, for exportation; and therefore it exports more of it abroad than any port except Hull. The foreign trade of the merchants here, is very conſiderable, eſpecially to Holland, Norway, and the Baltic, and alſo to Spain and Portugal; and formerly they drove a good trade to France, till it was turned off, by treaties on one hand, and by prohibitions, high duties, &c. on the other, to Spain and Portugal. The harbour is ſafe when ſhips are in it, but difficult to enter by reaſon of the many flats and ſhoals in the paſſage; which, however, are well buoyed, and good pilots are always ready. The town conſiſts of about 2400 houſes; and appears to have been very ſtrong, by the ruins of the works demoliſhed in the civil wars. St Ann's platform at the north end mounts 12 great guns, and commands all the ſhips paſſing near the harbour: and towards the land, beſides the wall, there is a ditch. Four rivulets run through the town; and the tide of the Ouſe, which is about as broad here as the Thames at London bridge, riſes 20 feet perpendicular. In the great market-place a ſtatue was erected in 1686 to the honour of King James II. There is another ſpacious market-place, adorned with a ſtatue of King William III. and a fine croſs with a dome and gallery round it, ſupported by 16 pillars. The market-houſe is of free-ſtone, ſupported by 16 columns, and is 70 feet high, erected on four ſteps, neatly adorned with ſtatues, &c. Every firſt Monday in the month, the mayor, aldermen, preachers, &c. meet to hear and determine all controverſies amicably, for preventing law-ſuits. This was firſt eſtabliſhed in 1588, and is called *The Feaſt of Reconciliation*. The markets are on Tueſdays and Saturdays; and it has two fairs; one of which, beginning Feb. 14. laſts for a fortnight, and is called Lynn mart; the other is a cheeſe fair on Oct. 6. The adherence of this town to King John and to Henry VIII. as above mentioned, are not the only inſtances of its loyalty to its ſovereigns; for, in the late civil wars, it held out for King Charles I. and ſuſtained a formal ſiege of above 18,000 men of the parliament army for above three weeks; but, for want of relief, was obliged to ſurrender, and ſubmit to the terms of paying 10s. a-head for every inhabitant, and a month's pay to the ſoldiers, to ſave the town from plunder. There are more gentry, and conſequently more gaiety, in this town than in Yarmouth or even Norwich; there being ſuch plenty of eatables and drinkables, that Spelman ſays, Ceres and Bacchus ſeem to have eſtabliſhed their magazines at this place; the eaſt ſide abounding with corn, ſheep, rabbits, hares, &c. the weſt ſide with cheeſe, butter, black cattle, ſwans, and the wild-fowl common to marſhes, beſides the abundance of ſea and river fiſh; ſo that he thinks there is no place in Great Britain, if in Europe, has ſuch a variety in ſo ſmall a compaſs of ground. At a ſmall diſtance from the town, ſtands a mount, called the Lady's or Red Mount, which was once a chapel dedicated to the Virgin Mary, which was a reſting-place for pilgrims on their way towards her convent at Walſingham. The king's ſtaith-yard, or quay, where the greateſt part of the imported wines is landed and put into large vaults, is a handſome ſquare, with brick buildings, in the centre whereof is a ſtatue of King James I. People paſs hence into the fen-country, and over the famous waſhes into Lincolnſhire in boats, which are often loſt, by venturing out at an improper ſeaſon and without guides.

LYNX. See Felis, Mammalia *Index*.

LYON *King of Arms*. See King; and Law, N° clviii. 16.

This office is of great antiquity and reſpect in Scotland; and although the preciſe time of its inſtitution is unknown, yet it muſt have been as early as the introduction of armorial figures as hereditary marks of gentility and diſtinction into this country, which was in the 12th century. His regalia are, a crown of gold, with a crimſon velvet cap, a gold taſſel, and an ermine lining: a velvet robe reaching to his feet, with the arms of the kingdom embroidered thereon before and behind in the proper tinctures; a triple row of gold chain round his neck, with an oval gold medal pendant thereto, on one ſide of which is the royal bearing, and on the other St Andrew with his croſs enamelled in proper colours, and a baton of gold enamelled green, powdered with the badges of the kingdom. The lord lyon's rank is ſuperior to that of any other king of arms, as he holds his office immediately from the ſovereign by commiſſion under the great ſeal; whereas the kings of arms in England are deputies to the earl marſhal, and act under his authority. Formerly Scotland was divided into two provinces, the one on the north and the other on the ſouth ſide of Forth; and theſe provinces were under the management of two deputies appointed by the lord lyon, to ſuperintend the execution of all the buſineſs of his office. Before the Revolution, the lord lyon, at his admiſſion into office, was moſt ſolemnly crowned by the ſovereign or his commiſſioner, in preſence of the nobility, the officers of ſtate, and other great men, after a ſuitable ſermon preached in the royal chapel; and his crown was of the ſame form with the imperial crown of the kingdom. On ſolemn occaſions he wears the regalia above deſcribed; at all other times he wears the oval gold medal or badge on his breaſt, ſuſpended by a broad green ribbon. He has the abſolute diſpoſal of all the offices in his own court, and of the heralds and purſuivants places. The meſſengers at arms throughout Scotland are alſo created by him, and are amenable to his juriſdiction. And the powers veſted in him by his commiſſion are the ſame with thoſe of the ſovereign in all matters relative to the marks of gentility.

LYONET, Peter, an ingenious naturaliſt, and member of ſeveral learned ſocieties, was born at Maeſtricht, and was deſcended from a very ancient and reſpectable family of Lorrain. He had ſcarcely attained his ſeventh year before he diſplayed an uncommon ſtrength and agility in all bodily exerciſes; but he was not leſs diligent in the improvement of his mind. Being placed at the Latin ſchool, he learned chronology, and exerciſed himſelf in Latin, Greek, and French poetry, as alſo in Hebrew, logic, and the Carteſian phyſics. He was particularly fond of the ſtudy of languages,

guages, whereof he underſtood no leſs than nine, living and dead. Having entered the univerſity of Leyden, he ſtudied the Newtonian philoſophy, geometry, algebra, &c.; but his father (who was a clergyman), deſiring he ſhould attach himſelf to divinity, he reluctantly abandoned the former ſtudies, as his paſſion for them was not eaſily to be overcome. He at the ſame time applied himſelf to anatomy, and alſo to muſic and drawing. He began afterwards to practiſe ſculpture: and performed ſeveral pieces in wood, ſome of which are preſerved, and have been greatly admired by the artiſts. After this, he betook himſelf to drawing portraits of his friends from life; wherein, after three or four months practice, he became a great proficient. Having attained the degree of candidate in divinity, he reſolved to ſtudy law, to which he applied himſelf with ſo much zeal, that he was promoted at the end of the firſt year. Arrived at the Hague, he undertook the ſtudy of decyphering; and became ſecretary of the cyphers, tranſlator of the Latin and French languages, and patent-maſter to their High Mightineſſes. Meanwhile, having taken a ſtrong liking to the ſtudy of inſects, he undertook an hiſtorical deſcription of ſuch as are found about the Hague, and to that end collected materials for ſeveral volumes; and having invented a method of drawing adapted thereto, he enriched this work with a great number of plates, univerſally admired by all the connoiſſeurs who had ſeen them. In the year 1724 was printed at the Hague a French tranſlation of a German work, the 'Theology of Inſects,' by Mr Leſſer. Love of truth engaged Mr Lyonet to defer the publication of his above-mentioned deſcription, and to make ſome obſervations on that work, to which he has added two moſt beautiful plates, engraved from his deſigns. This performance cauſed his merit to be univerſally known and admired. The celebrated M. de Reaumur had the above tranſlation reprinted at Paris, not ſo much on account of the work itſelf as of Mr Lyonet's obſervations; and beſtowed on it, as did alſo many other authors, the higheſt encomiums. He afterwards executed drawings of the freſh water polypus for Mr Trembley's beautiful work, 1744. The ingenious Wandelaar had engraved the firſt five plates; when Mr Lyonet, who had never witneſſed this operation, concerned at the difficulties he experienced in getting the remaining eight finiſhed in the ſuperior ſtyle he required, reſolved to perform the taſk himſelf. He accordingly took a leſſon of one hour of Mr Wandelaar, engraved three or four ſmall plates, and immediately began upon the work himſelf, which he performed in ſuch a manner as drew on him the higheſt degree of praiſe, both from Mr Trembley and from many other artiſts, particularly the celebrated Van Gool; who declared that the performance aſtoniſhed not only the amateurs, but alſo the moſt experienced artiſts. In 1748 he was choſen member of the Royal Society of London. In 1749 he began (by mere chance) his amazing collection of horns and ſhells, which, according to the univerſal teſtimony of all travellers and amateurs who have viſited it, is at preſent the moſt beautiful, and certainly one of the moſt valuable, in Europe. In 1753 he became member of the newly-eſtabliſhed Dutch Society of Sciences at Haerlem; and in 1757, after the celebrated M. le Cat, profeſſor in anatomy and ſurgery, and member of almoſt all the principal ſocieties in Europe, had ſeen Mr Lyonet's incomparable *Traité Anatomique de la Chenille qui ronge le Bois de Saule*, with the drawings belonging to it (which work was afterwards publiſhed), he was elected member of the Royal Academy of Sciences of Rome, whereof M. le Cat was perpetual ſecretary. After the publication of this treatiſe, he became, in 1760, member of the Royal Academy of Sciences of Berlin; in 1761, of the Imperial Academy of Naturaliſts; and, in 1762, of the Imperial Academy of Sciences at St Peterſburgh. In order to enable ſuch as might be deſirous of following him in his intricate and moſt aſtoniſhing diſcoveries reſpecting the ſtructure of this animal, Mr Lyonet publiſhed, in the Tranſactions of the Dutch Society of Sciences at Haerlem, a deſcription and a plate (as he alſo afterwards did in French at the beginning of his *Traité Anatomique*) of the inſtrument and tools he had invented for the purpoſe of diſſection, and likewiſe of the method he uſed to aſcertain the degree of ſtrength of his magnifying glaſſes. Notwithſtanding all this labour, which was conſiderably increaſed by the extenſive correſpondence which he for many years carried on with ſeveral learned and reſpectable perſonages, he ſtill found means to ſet apart a large proportion of his time (as he himſelf mentions it in his preface) for the immediate ſervice of his country; but was not fortunate enough (as appears by his writings) to get any other recompenſe for his exertions than ſorrow and diſappointment.—During the laſt fifteen or twenty years of his life, Mr Lyonet added to the valuable treaſure he had already collected of natural curioſities, a moſt ſuperb cabinet of paintings, conſiſting of more than 560 performances; among which are many of the moſt eminent works of the firſt Dutch maſters. He did this with a view to procure himſelf ſome amuſement during the latter part of his life, when old age and infirmities muſt weaken his powers, and ſet bounds to his activity. He had always indeed accuſtomed himſelf to employment, inſomuch that he has written ſome pieces of Dutch poetry; and this diſpoſition remained with him till within a fortnight of his death, when he was attacked with an inflammation in his breaſt, which, though apparently cured, was, in the end, the cauſe of his diſſolution. He died at the Hague in January 1789, aged 83 years, leaving behind him a moſt eſtimable character.

LYONOIS, a large province of France; bounded on the north by Burgundy; on the eaſt, by Dauphiny, Breſſe, and the principality of Dombs; on the ſouth, by Vivarais and Veley; and on the weſt by Auvergne and a ſmall part of Bourbonnois. It comprehends Lower Lyonois, Beaujolois, and Forez; and it produces corn, wine, fruits, and more eſpecially excellent cheſnuts. The principal rivers are the Saone, the Rhone, and the Loire. Lyons is the capital town.

LYONS, a large, rich, handſome, ancient, and famous town of France, being the moſt conſiderable in the kingdom, next to Paris, with an archbiſhop's ſee, an academy of ſciences and belles lettres, and an academy of arts and ſciences ſettled here in 1736. It is ſeated in the centre of Europe, on the confluence of the rivers Rhone and Saone: on the ſide of it are two high mountains; and the mountain of St Sebaſtian ſerves as a bulwark againſt the north winds, which often blow here with great violence. It contains about 150,000 inhabitants; and the houſes, in general, are high and well built. It has ſix gates, and as many ſuburbs. The town-houſe, the arſenal, the amphitheatre built by the ancient Romans, the hoſpital, and the numerous palaces, are worthy of a traveller's attention. The cathedral is a ſuperb ſtructure, and the canons that compoſe the chapter are all perſons of diſtinction. It is a place of very great trade, which is extended through Europe. It derives vaſt advantages from the rivers near it; and is ſituated in E. Long. 4. 35. N. Lat. 45. 46. Lyons was the ſcene of ſome the horrid tranſactions of the French revolution. See FRANCE.

LYRA, a ſpecies of fiſh. See CALLYONIMUS, ICHTHYOLOGY *Index*.

LYRA, in *Aſtronomy*, a conſtellation in the northern hemiſphere. The number of its ſtars, in Ptolemy's catalogue, is ten; in Tycho's eleven; in Hevelius's ſeventeen; and in the Britannic catalogue twenty-one.

LYRE, a muſical inſtrument of the ſtringed kind, much uſed by the ancients.

Concerning the number of ſtrings with which this inſtrument was furniſhed, there is great controverſy. Some aſſert it to be only three; and that the ſounds of the two remote were acute, and that of the intermediate one a mean between thoſe two extremes; that Mercury, the inventor, reſembled thoſe three chords to as many ſeaſons of the year, which were all that the Greeks reckoned, namely, ſummer, winter, and ſpring: aſſigning the acute to the firſt, the grave to the ſecond, and the mean to the third.

Others aſſert that the lyre had four ſtrings; that the interval between the firſt and the fourth was an octave; that the ſecond was a fourth from the firſt, and the fourth the ſame diſtance from the third, and that from the ſecond to the third was a tone.

Another claſs of writers contend that the lyre of Mercury had ſeven ſtrings. Nicomachus, a follower of Pythagoras, and the chief of them, gives the following account of the matter: "The lyre made of the ſhell was invented by Mercury; and the knowledge of it, as it was conſtructed by him of ſeven ſtrings, was tranſmitted to Orpheus: Orpheus taught the uſe of it to Thamyris and Linus; the latter of whom taught it to Hercules, who communicated it to Amphion the Theban, who built the ſeven gates of Thebes to the ſeven ſtrings of the lyre." The ſame author proceeds to relate, "That Orpheus was afterwards killed by the Thracian women; and that they are reported to have caſt his lyre into the ſea, which was afterwards thrown up at Antiſſa, a city of Leſbos: that certain fiſhers finding it, they brought it to Terpander, who carried it into Egypt, exquiſitely improved, and, ſhowing it to the Egyptian prieſts, aſſumed to himſelf the honour of its invention."

This difference among authors ſeem to have ariſen from their confounding together the Egyptian and the Grecian Mercuries.—The invention of the primitive lyre with three ſtrings was due to the firſt Egyptian HERMES, as mentioned under that article.—The lyre attributed to the Grecian Mercury is deſcribed by almoſt all the poets to be an inſtrument of ſeven ſtrings †. Vincenzio Galilei has collected the various opinions of the ſeveral Greek writers who have mentioned the invention of the chelys or teſtudo; and the late Mr Spence has done the ſame in a very circumſtantial but ludicrous manner. "Horace talks of Mercury as a wonderful muſician, and repreſents him with a lyre. There is a ridiculous old legend relating to this invention, which informs us, that Mercury, after ſtealing ſome bulls from Apollo, retired to a ſecret grotto, which he uſed to frequent, at the foot of a mountain in Arcadia. Juſt as he was going in, he found a tortoiſe feeding at the entrance of his cave: he killed the poor creature, and perhaps ate the fleſh of it. As he was diverting himſelf with the ſhell, he was mightily pleaſed with the noiſe it gave from its concave figure. He had poſſibly been cunning enough to find out, that a thong pulled ſtrait and faſtened at each end, when ſtruck with the finger, made a ſort of muſical ſound. However that was, he went immediately to work, and cut ſeveral thongs out of the hides he had lately ſtolen, and faſtened them as tight as he could to the ſhell of this tortoiſe; and, in playing with them, made a new kind of muſic with them to divert himſelf in his retreat." This, conſidered only as an account of the firſt invention of the lyre, is not altogether ſo unnatural.

The moſt ancient repreſentations of this inſtrument agree very well with the account of its invention: the lyre, in particular on the old celeſtial globes, was repreſented as made of one entire ſhell of a tortoiſe; and that of Amphion in the celebrated group of the Dirce or Toro, in the Farneſe palace at Rome, which is of Greek ſculpture, and very high antiquity, is figured in the ſame manner.

There have, however, been many other claimants to the ſeven-ſtringed lyre. For though Mercury invented this inſtrument in the manner already related, it is ſaid he afterwards gave it to Apollo, who was the firſt that played upon it with method, and made it the conſtant companion of poetry. According to Homer's account of this tranſaction, in his hymn to Mercury, it was given by that god to Apollo, as a peace-offering and indemnification for the oxen which he had ſtolen from him:

> To Phœbus Maia's ſon preſents the lyre,
> A gift intended to appeaſe his ire,
> The god receives it gladly, and eſſays
> The novel inſtrument a thouſand ways;
> With dext'rous ſkill the plectrum wields; and ſings
> With voice accordant to the trembling ſtrings,
> Such ſtrains as gods and men approv'd, from whence
> The ſweet alliance ſprung of ſound and ſenſe.

Diodorus informs us, that Apollo ſoon repenting of the cruelty with which he had treated Marſyas in conſequence of their muſical conteſt, broke the ſtrings of the lyre, and by that means put a ſtop for a time to any further progreſs in the practice of that new inſtrument. "The Muſes (adds he) afterwards added to this inſtrument the ſtring called *meſe;* Linus, that of *lichanos;*

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† See *Mercury*.

and Orpheus and Thamyris, thoſe ſtrings which are named *hypate* and *parhypate* (A).

Again, Many ancient and reſpectable authors tell us, that, before the time of Terpander, the Grecian lyre had only four ſtrings; and, if we may believe Suidas, it remained in this ſtate 856 years, from the time of Amphion, till Terpander added to it three new ſtrings, which extended the muſical ſcale to a heptachord, or ſeventh, and ſupplied the player with two conjoint tetrachords. It was about 150 years after this period, that Pythagoras is ſaid to have added an eighth ſtring to the lyre, in order to complete the octave, which conſiſted of two disjoint tetrachords.

Boetius gives a different hiſtory of the ſcale, and tells us, that the ſyſtem did not long remain in ſuch narrow limits as a tetrachord. Choræbus, the ſon of Athis, or Atys, king of Lydia, added a fifth ſtring; Hyagnis, a ſixth; Terpander, a ſeventh; and at length Lychaon of Samos, an eighth. But all theſe accounts are irreconcilable with Homer's hymn to Mercury, where the chelys, or teſtudo, the invention of which he aſcribes to that god, is ſaid to have had ſeven ſtrings. There are many claimants among the muſicians of ancient Greece to the ſtrings that were afterwards added to theſe, by which the ſcale, in the time of Ariſtoxenus, was extended to two octaves. Athenæus, more than once, ſpeaks of the nine-ſtringed inſtrument; and Ion of Chios, a tragic and lyric poet and philoſopher, who firſt recited his pieces in the 82d Olympiad, 452 B. C. mentions, in ſome verſes quoted by Euclid, the ten-ſtringed lyre; a proof that the third conjoint tetrachord was added to the ſcale in his time, which was about 50 years after Pythagoras is ſuppoſed to have conſtructed the octachord.

The different claimants among the Greeks to the ſame muſical diſcoveries, only prove that muſic was cultivated in different countries, and that the inhabitants of each country invented and improved their own inſtruments, ſome of which happening to reſemble thoſe of other parts of Greece, rendered it difficult for hiſtorians to avoid attributing the ſame invention to different perſons. Thus the ſingle flute was given to Minerva and to Marſyas; the ſyrinx or fiſtula, to Pan and to Cybele; and the lyre or cithara, to Mercury, Apollo, Amphion, Linus, and Orpheus. Indeed, the mere addition of a ſtring or two to an inſtrument without a neck, was ſo obvious and eaſy, that it is ſcarce poſſible not to conceive many people to have done it at the ſame time.

With reſpect to the form of the ancient lyre, as little agreement is to be found among authors as about the number of ſtrings. The beſt evidences concerning it, are the repreſentations of that inſtrument in the hands of ancient ſtatues, bas-reliefs, &c. See Plate CCXCVIII. where,

Fig. 1. is a repreſentation of the teſtudo, or lyre of Amphion, in front, as it appears on the baſe of the celebrated Toro Farneſe at Rome. This admirable work, conſiſting of four figures bigger than the life, beſides the toro or bull, was found in Caracalla's baths, where the Farneſe Hercules was likewiſe diſcovered: and, except the Laocoon, is the only piece of Greek ſculpture mentioned by Pliny that is now remaining. The two projections near the bottom, ſeem to have been faſtenings for the ſtrings, and to have anſwered the purpoſe of tail-pieces in modern inſtruments.

2. The lyre held by Terpſichore, in the picture of that muſe dug out of Herculaneum.

3. The Abyſſinian teſtudo, or lyre in uſe at preſent in the province of Tigre, from a drawing of Mr Bruce, communicated to Dr Burney. "This inſtrument (ſays he) has ſometimes five, ſometimes ſix, but moſt frequently ſeven ſtrings, made of the thongs of raw ſheep or goat ſkins, cut extremely fine, and twiſted; they rot ſoon, are very ſubject to break in dry weather, and have ſcarce any ſound in wet. From the idea, however, of this inſtrument being to accompany and ſuſtain a voice, one would think that it was better mounted formerly. "The Abyſſinians have a tradition, that the ſiſtrum, lyre, and tambourine, were brought from Egypt into Ethiopia, by Thot, in the very firſt ages of the world. The flute, kettle-drum, and trumpet, they ſay, were brought from Paleſtine, with Menelek, the ſon of their queen of Saba by Solomon, who was their firſt Jewiſh king.

"The lyre in Amharic is called *beg*, 'the ſheep; in Ethiopic it is called *meſinko;* the verb *ſinko* ſignifies to ſtrike ſtrings with the fingers: no plectrum is ever uſed in Abyſſinia; ſo that meſinko, being literally interpreted, will ſignify the 'ſtringed inſtrument played upon with the fingers.'

"The ſides which conſtitute the frame of the lyre, were anciently compoſed of the horns of an animal of the goat kind, called *agazen*, about the ſize of a ſmall cow, and

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(A) It has been already related, that the lyre invented by the Egyptian Mercury had but three ſtrings; and, by putting theſe two circumſtances together, Dr Burney obſerves, we may perhaps acquire ſome knowledge of the progreſs of muſic, or, at leaſt, of the extenſion of its ſcale, in the higheſt antiquity.

Meſe, in the Greek muſic, is the fourth ſound of the ſecond tetrachord of the great ſyſtem, and firſt tetrachord invented by the ancients, anſwering to our A, on the fifth line in the baſe. If this ſound then was added to the former three, it proves two important points; firſt, that the moſt ancient tetrachord was that from E in the baſe to A; and that the three original ſtrings in the Mercurian and Apollonian lyre were tuned E, F, G, which the Greeks called *Hypate Meſon*, *Parhypate Meſon*, *Meſon Diatonos.* The addition therefore of *Meſe* to theſe, completed the firſt and moſt ancient tetrachord, E, F, G, A.

The ſtring *lichanos*, then, being added to theſe, and anſwering to our D on the third line in the baſe, extended the compaſs downwards, and gave the ancient lyre a regular ſeries of five ſounds in the Dorian mode, the moſt ancient of all the Greek modes; and the two ſtrings call *Hypate* and *Parhypate*, correſponding with our B and C in the baſe, completed the heptachord, or ſeven ſounds, B, C. D, E, F, G, A, a compaſs that received no addition till after the time of Pindar, who calls the inſtrument then in uſe the *ſeven-tongued lyre.*

and common in the province of Tigre. I have ſeen ſeveral of theſe inſtruments very elegantly made of ſuch horns, which nature ſeems to have ſhaped on purpoſe. Some of the horns of an African ſpecies of this animal may be ſeen in M. Buffon's hiſtory of the king of France's cabinet. They are bent, and leſs regular than the Abyſſinian; but after fire-arms became common in the province of Tigre, and the woods were cut down, this animal being more ſcarce, the lyre has been made of a light red wood; however, it is always cut into a ſpiral twiſted form, in imitation of the ancient materials of which the lyre was compoſed. The drawing I ſend you was one of theſe inſtruments made of wood.

"The kingdom of Tigre, which is the largeſt and moſt populous province of Abyſſinia, and was during many ages the ſeat of the court, was the firſt which received letters, and civil religious government; it extended once to the Red ſea: various reaſons and revolutions have obliged the inhabitants to reſign their ſea coaſt to different barbarous nations, Pagan and Mahometan: while they were poſſeſſed of it, they ſay that the Red ſea furniſhed them with tortoiſe-ſhells, of which they made the bellies of their lyres, as the Egyptians did formerly, according to Apollodorus and Lucian; but having now loſt that reſource, they have adopted in its place a particular ſpecies of gourd, or pumpkin, very hard and thin in the bark, ſtill imitating with the knife the ſquares, compartments, and figure of the ſhell of the tortoiſe.

"The lyre is generally from three feet to three feet ſix inches high; that is, from a line drawn through the point of the horns, to the lower part of the baſe of the ſounding board. It is exceedingly light, and eaſy of carriage, as an inſtrument ſhould naturally be in ſo rugged and mountainous a country.

"When we conſider the parts which compoſe this lyre, we cannot deny it the earlieſt antiquity. Man in his firſt ſtate was a hunter and a fiſher, and the oldeſt inſtrument was that which partakes moſt of that ſtate. The lyre, compoſed of two principal pieces, owes the one to horns of an animal, the other to the ſhell of a fiſh.

"It is probable, that the lyre continued with the Ethiopians in this rude ſtate as long as they confined themſelves to their rainy, ſteep, and rugged mountains; and afterwards, when many of them deſcended along the Nile into Egypt, its portability would recommend it in the extreme heats and wearineſs of their way. Upon their arrival in Egypt, they took up their habitation in caves, in the ſides of mountains, which are inhabited to this day. Even in theſe circumſtances, an inſtrument larger than the lyre muſt have been inconvenient and liable to accidents in thoſe caverns; but when theſe people increaſed in numbers and courage, they ventured down into the plain, and built Thebes. Being now at their eaſe, and in a fine climate, all nature ſmiling around them, muſic and other arts were cultivated and refined, and the imperfect lyre was extended into an inſtrument of double its compaſs and volume. The ſize of the harp could be now no longer an objection; the Nile carried the inhabitants everywhere eaſily, and without effort; and we may naturally ſuppoſe in the fine evenings of that country, that the Nile was the favourite ſcene upon which this inſtrument was practiſed; at leaſt the ſphinx and lotus upon its head, ſeem to hint that it was ſomeway connected with the overflowings of that river." See Harp.

4. An Etruſcan lyre, with ſeven ſtrings, in the collection of Etruſcan, Greek and Roman antiquities, publiſhed from the cabinet of the Hon. Sir William Hamilton, Vol I. Naples 1766. Plate CIX. With reſpect to this inſtrument, it is worthy of obſervation, that though the vaſe upon which it is repreſented is of ſuch indiſputable and remote antiquity, the tail-piece, bridge, belly, and ſound-holes, have a very modern appearance, and manifeſt a knowledge in the conſtruction of muſical inſtruments among the Etruſcans ſuperior to that of the Greeks and Romans in much latter times. The lower part of the inſtrument has much the appearance of an old baſs-viol, and it is not difficult to diſcover in it more than the embryo of the whole violin family. The ſtrings lie round, as if intended to be played on with a bow; and even the croſs lines on the tail-piece are ſuch as we frequently ſee on the tail-pieces of old viols.

5. The Tripodian lyre of Pythagoras the Zacynthian, from a bas-relief in the Maffei palace at Rome repreſenting the whole choir of the muſes. Athenæus gives the following account of this extraordinary inſtrument, Lib. XIV. cap. xv. p. 637. Many ancient inſtruments are recorded (ſays Artemon), of which we have ſo little knowledge, that we can hardly be certain of their exiſtence; ſuch as the tripod of Pythagoras the Zacynthian, which, on account of its difficulty, continued in uſe but a ſhort time. It reſembled in form the Delphic tripod, whence it had its name. The legs were equidiſtant, and fixed upon a moveable baſe that was turned by the foot of the player: the ſtrings were placed between the legs of the ſtool; the vaſe at the top ſerved for the purpoſe of a ſound-board, and the ſtrings of the three ſides of the inſtrument were tuned to three different modes, the Doric, Lydian, and Phrygian. The performer ſat on a chair made on purpoſe: ſtriking the ſtrings with the fingers of the left hand, and uſing the plectrum with the right, at the ſame time turning the inſtrument with his foot to whichever of the three modes he pleaſed: ſo that by great practice he was enabled to change the modes with ſuch velocity, that thoſe who did not ſee him would imagine they heard three different performers playing in three different modes. After the death of this admirable muſician, no other inſtrument of the ſame kind was ever conſtructed."

6. A lyre in the famous ancient picture dug out of Herculaneum, upon which Chiron is teaching the young Achilles to play. See Chiron.

LYRIC poetry, was ſuch as the ancients ſung to the lyre or harp.—It was originally employed in celebrating the praiſes of gods and heroes, and its characteriſtic was ſweetneſs. Who was the author of it is not known. It was much cultivated by the Greeks: and Horace was the firſt who attempted it in the Latin language. Anacreon, Alcæus, Steſichorus, Sappho, and Horace, were the moſt celebrated lyric poets of antiquity.

LYRODI, among the ancients, a kind of muſicians who played on the lyre, and ſung at the ſame time.

This appellation was alſo given to ſuch as made it their employment to ſing lyric poems compoſed by others.

LYS, or Lis. See Lis.

Lys, the name of a meaſure uſed by the Chineſe in eſtimating diſtances. Two hundered lys make 60 geographical miles, which are equal to one degree.

LYSANDER, a famous Spartan general. See Sparta.

LYSANDRIA, a Samian feſtival, celebrated with games and ſacrifices in honour of the Lacedemonian general Lyſander. It was anciently called *herea*: but this name the Samians aboliſhed by a public decree.

LYSIARCH, an ancient magiſtrate, who ſuperintended the ſacred games, and preſided in matters of religion in the province of Lycia. He was created in a council conſiſting of deputies from all the provincial cities, in number 23. The lyſiarchs were both heads of the council and pontiffs of the province.

LYSIAS, an ancient Grecian orator, was born at Syracuſe in the 80th Olympiad. At 15, he went to Thurion, a colony of the Athenians; and when grown up, aſſiſted in the adminiſtration of the government there many years. When about 47 years of age, he returned to Athens; whence, being afterwards baniſhed by the 30 tyrants, he went to Megara. Upon his return, Thraſybulus would have had him employed again in ſtate matters; but this not taking place, he ſpent the remainder of his life as a private man. He was very familiar with Socrates, and other illuſtrious philoſophers. He profeſſed to teach the art of ſpeaking; not that he pleaded at the bar himſelf, but he ſupplied others with ſpeeches. "Fuit Lyſias in cauſis forenſibus non verſatus (ſays Cicero), ſed egregie ſubtilis ſcriptor atque elegans," &c. Quintilian calls him, "ſubtilis atque elegans, et quo nihil, ſi oratorio ſatis ſit docere, quæras perfectius. Nihil enim eſt inane, nihil arceſſitum; puro tamen fonti, quam magno flumini, proprior." Plutarch and Photius relate, that 425 orations were formerly exhibited under the name of Lyſias; of which 34 only are now extant. The beſt edition of them is by Dr John Taylor at London, 1739, 4to; Cambridge, 1740, 8vo.

LYSIMACHIA, loosestrife, a genus of plants belonging to the pentandria claſs; and in the natural method ranking under the 20th order, *Rotaceæ*. See Botany *Index*.

LYSIPPUS, a celebrated Greek ſtatuary, was born at Sicyone, and firſt followed the buſineſs of a lockſmith, which he quitted in order to practiſe painting: But he afterwards applied himſelf entirely to ſculpture; in which he acquired an immortal reputation, and made a great number of ſtatues that were the admiration of the people of Athens and Rome. His grand ſtatue of the Sun repreſented in a car drawn by four horſes, was worſhipped at Rhodes. He made ſeveral ſtatues of Alexander and his favourites, which were brought to Rome by Metellus after he had reduced the Macedonian empire; and the ſtatue of a man wiping and anointing himſelf after bathing, being particularly excellent, was placed by Agrippa before his baths in that city. He lived in the time of Alexander the Great, about 334 B. C.; and left three ſons, who were all famous ſtatuaries.

LYTHRUM, fertile loosestrife, a genus of plants belonging to the decandria claſs; and in the natural method ranking under the 17th order, *Calycanthemæ*. See Botany *Index*.

LYTTELTON, Edward, Lord Lyttelton, keeper of the great ſeal in the reign of Charles I. was eminent for his probity and his moderation at the commencement of that monarch's diſputes with his ſubjects. Without forfeiting his fidelity to the king, he preſerved the eſteem of the parliament till 1644, when he was made colonel of a regiment in the king's army at York. He died in 1645. Beſides ſeveral of his ſpeeches which have been printed, he wrote reports in the common pleas and exchequer, printed at London in 1683, in folio; ſeveral arguments and diſcourſes, &c.

Lyttelton, *George Lord*, eldeſt ſon of Sir Thomas Lyttelton, Bart. deſcended from the great judge Lyttelton, was born in 1700, at ſeven months; and the midwife ſuppoſing him to be dead, threw him careleſsly into the cradle; where, had not ſome ſigns of life been taken notice of by one of the attendants, he might never have recovered. He received the elements of his education at Eaton-ſchool, where he ſhowed an early inclination to poetry. His paſtorals and ſome other light pieces were originally written in that ſeminary of learning; from whence he was removed to the univerſity of Oxford, where he purſued his claſſical ſtudies with uncommon avidity, and ſketched the plan of his Perſian Letters; a work which afterwards procured him great reputation, not only from the elegance of the language in which they were compoſed, but from the excellent obſervations they contained on the manners of mankind.

In the year 1728, he ſet out on the tour of Europe; and, on his arrival at Paris, accidentally became acquainted with the honourable Mr Poyntz, then our miniſter at the court of Verſailles; who was ſo ſtruck with the extraordinary capacity of our young traveller, that he invited him to his houſe, and employed him in many political negociations, which he executed with great judgement and fidelity.

Mr Lyttelton's conduct, while on his travels, was a leſſon of inſtruction to the reſt of his countrymen. Inſtead of lounging away his hours at the coffee-houſes frequented by the Engliſh, and adopting the faſhionable follies and vices of France and Italy, his time was paſſed alternately in his library and in the ſociety of men of rank and literature. In this early part of his life, he wrote a poetical epiſtle to Dr Ayſcough, and another to Mr Pope, which ſhow ſingular taſte and correctneſs.

After continuing a conſiderable time at Paris with Mr Poyntz, who, to uſe his own words, behaved like a ſecond father to him, he proceeded to Lyons and Geneva; and from thence to Turin, where he was honoured with great marks of friendſhip by his Sardinian majeſty. He then viſited Milan, Venice, Genoa, and Rome, where he applied himſelf cloſely to the ſtudy of the fine arts; and was, even in that celebrated metropolis, allowed a perfect judge of painting, ſculpture, and architecture.

During his continuance abroad, he conſtantly correſponded with Sir Thomas, his father. Several of his letters are yet remaining, and place his filial affection in a very diſtinguiſhed light. He ſoon after returned to his native country, and was elected repreſentative for the borough of Okehampton in Devonſhire: and behaved ſo much to the ſatisfaction of his conſtituents, that they ſeveral times re-elected him for the ſame place without putting him to the leaſt expence.

About this period, he received great marks of friendſhip from Frederic prince of Wales, father of his preſent majeſty: and was, in the year 1737, appointed principal ſecretary to his royal highneſs, and continued in the ſtricteſt intimacy with him till the time of his death. His attention to public buſineſs did not, however, prevent him from exerciſing his poetical talent. A moſt amiable young lady, Miſs Forteſcue, inſpired him with a paſſion, which produced a number of little pieces, remarkable for their tenderneſs and elegance; and he had a happy facility of making out an extempore compliment, which obtained him no ſmall ſhare of reputation. One evening being in company with Lord Cobham and ſeveral of the nobility at Stowe, his lordſhip mentioned his deſign of putting up a buſt of Lady Suffolk in his beautiful gardens; and, turning to Mr Lyttelton, ſaid, "George, you muſt furniſh me with a motto for it." "I will, my lord," anſwered Mr Lyttelton; and directly produced the following couplet:

Her wit and beauty for a court were made,
But truth and goodneſs fit her for a ſhade.

When Mr Pitt, the late earl of Chatham, loſt his commiſſion in the guards, in conſequence of his ſpirited behaviour in parliament, Mr Lyttelton was in waiting at Leiceſter-houſe, and, on hearing the circumſtance, immediately wrote theſe lines:

Long had thy virtue mark'd thee out for fame,
Far, far ſuperior to a cornet's name;
This generous Walpole ſaw, and griev'd to find
So mean a poſt diſgrace that noble mind;
The ſervile ſtandard from thy free-born hand
He took, and bade thee lead the patriot band.

In the year 1742, he married Lucy, the daughter of Hugh Forteſcue, Eſq. of Filleigh in the county of Devon, the lady above-mentioned, whoſe exemplary conduct, and uniform practice of religion and virtue, eſtabliſhed his conjugal happineſs upon the moſt ſolid baſis.

In 1744, he was appointed one of the lords commiſſioners of the treaſury; and, during his continuance in that ſtation, conſtantly exerted his influence in rewarding merit and ability. He was the friend and patron of the late Henry Fielding, James Thomſon author of the Seaſons, Mr Mallet, Dr Young, Mr Hammond, Mr Weſt, Mr Pope, and Voltaire. On the death of Thomſon, who left his affairs in a very embarraſſed condition, Mr Lyttelton took that poet's ſiſter under his protection. He reviſed the tragedy of Coriolanus, which that writer had not put the laſt hand to; and brought it out at the theatre-royal, Covent-garden, with a prologue of his own writing, in which he ſo affectingly lamented the loſs of that delightful bard, that not only Mr Quin, who ſpoke the lines, but almoſt the whole audience, ſpontaneouſly burſt into ears.

In the beginning of the year 1746, his felicity was interrupted by the loſs of his wife, who died in the 29th year of her age; leaving him one ſon, Thomas, the late Lord Lyttelton; and a daughter, Lucy, who ſome time ſince married Lord Viſcount Valentia. The remains of his amiable lady were depoſited at Over-Arley in Worceſterſhire; and an elegant monument was erected to her memory in the church of Hagley, which contains the following inſcription written by her huſband:

Made to engage all hearts, and charm all eyes:
Tho' meek, magnanimous; tho' witty, wiſe;
Polite, as all her life in courts had been;
Yet good, as ſhe the world had never ſeen:
The noble fire of an exalted mind,
With gentleſt female tenderneſs combin'd.
Her ſpeech was the melodious voice of love,
Her ſong the warbling of the vernal grove.
Her eloquence was ſweeter than her ſong,
Soft as her heart, and as her reaſon ſtrong.
Her form each beauty of her mind expreſs'd,
Her mind was virtue by the Graces dreſs'd.

Beſides theſe beautiful lines, Mr Lyttelton wrote a monody on the death of his lady, which will be remembered while conjugal affection and a taſte for poetry exiſt in this country.

His maſterly obſervations on the converſion and apoſtleſhip of St Paul, were written at the deſire of Gilbert Weſt, Eſq. in conſequence of Mr Lyttelton's aſſerting, that, beſide all the proofs of the Chriſtian religion, which might be drawn from the prophecies of the Old Teſtament, from the neceſſary connection it has with the whole ſyſtem of the Jewiſh religion, from the miracles of Chriſt, and from the evidence given of his reſurrection by all the other apoſtles, he thought the converſion of St Paul alone, duly conſidered, was of itſelf a demonſtration ſufficient to prove Chriſtianity to be a divine revelation. Mr Weſt was ſtruck with the thought: and aſſured his friend, that ſo compendious a proof would be of great uſe to convince thoſe unbelievers that will not attend to a longer ſeries of arguments; and time has ſhown he was not out in his conjecture, as the tract is eſteemed one of the beſt defences of Chriſtianity which has hitherto been publiſhed.

In 1754, he reſigned his office of lord of the treaſury, and was made cofferer to his majeſty's houſehold, and ſworn of the privy-council: previous to which, he married, a ſecond time, Elizabeth daughter of Field-marſhal Sir Robert Rich; whoſe indiſcreet conduct gave him great uneaſineſs, and from whom he was ſeparated, by mutual conſent, a few years after his marriage.

After being appointed chancellor and under treaſurer of the court of exchequer, he was, by letters-patent dated the 19th of November 1757, 31 Geo. II. created a peer of Great Britain, by the ſtyle and title of *Lord Lyttelton, baron of Frankley, in the county of Worceſter*. His ſpeeches on the Scotch and mutiny bills in the year 1747, on the Jew bill in 1753, and on the privilege of parliament in 1763, ſhowed ſound judgement, powerful eloquence, and inflexible integrity.

grity. During the laſt ten years he lived chiefly in retirement, in the continual exerciſe of all the virtues which can ennoble private life. His laſt work was Dialogues of the Dead, in which the morality of Cambray and the ſpirit of Fontenelle are happily united.

He was ſuddenly ſeized with an inflammation of the bowels, in the middle of July 1773, at his ſeat at Hagley; which terminated in his death, on the 22d of that month. His laſt moments were attended with unimpaired underſtanding, unaffected greatneſs of mind, calm reſignation, and humble but confident hopes in the mercy of God. As he had lived univerſally eſteemed, he died lamented by all parties. A complete collection of his works has been publiſhed ſince his deceaſe, by his nephew George Ayſcough, Eſq.

M.

M, a liquid conſonant, and the twelfth letter in the alphabet.

It has one unvaried ſound, and is pronounced by ſtriking the upper lip againſt the lower; in which the pronunciation of this letter agrees with that of *b*; the only difference between the two conſiſting in a little motion made in the noſe in pronouncing *m*, and not in *b*: whence it happens that thoſe who have taken cold, for *m* ordinarily pronounce *b*; the noſe in that caſe being diſabled from making the neceſſary motion.

All conſonants are formed with the aid of vowels; in *em* the vowel precedes, in *be* it follows; and *m* is never mute.

Quintilian obſerves, that the *m* ſometimes ends Latin words but never Greek ones; the Greeks always changing it in that caſe into *n*, for the ſake of the better ſound.

M is alſo a numeral letter, and among the ancients was uſed for a thouſand; according to the verſe,

M *caput eſt numeri, quem ſcimus mille teneri.*

When a daſh is added to the top of it, as $\overline{\text{M}}$; it ſignifies a thouſand times a thouſand.

M, as an abbreviature, ſtands for Manlius, Marcus, Martius, and Mucius: M. A. ſignifies *magiſter artium*, or maſter of arts; MS. manuſcript, and MSS. manuſcripts.

M, in aſtronomical tables, and other things of that kind, is uſed for *meridional* or ſouthern; and ſometimes for *meridian* or mid-day.

M, in medicinal preſcription, is frequently uſed to ſignify a maniple or handful; and it is ſometimes alſo put at the end of a recipe, for *miſce* "mingle;" or for *mixtura* "a mixture." Thus *m. f. julapium*, ſignifies "mix and make a julep."

M, in *Law*, the brand or ſtigma of a perſon convicted of manſlaughter, and admitted to the benefit of his clergy. It is to be burnt on the brawn of his left thumb.

MAAT, John. See Blankof.

MABILLON, John, a very learned writer of France in the 17th century, was born at Perremonte, on the frontiers of Champagne, in 1632. He was educated in the univerſity of Rheims, and afterwards entered into the abbey of the Benedictines of St Remy. In the year 1663, he was appointed keeper of the treaſures and monuments of France at St Dennis; but having unfortunately broke a looking glaſs there, which was pretended to have belonged to Virgil, he deſired leave of his ſuperiors to quit an employment which frequently obliged him to tell things he did not believe. Next year he went to Paris; and was very ſerviceable to Father d'Acheri, who was deſirous of having ſome young monk who could aſſiſt him in compiling his *Spicilegium*. This made him known. Soon after, the congregation of St Maur having formed a deſign of publiſhing new editions of the fathers, reviſed from the MSS. in the libraries of the Benedictines, Mabillon was charged with the edition of St Bernard, which he prepared with extraordinary diligence. After that, he publiſhed many other works, which are evidences of his vaſt capacity and induſtry. In 1682, he was employed by Mr Colbert in examining ſome ancient titles relating to the royal family. The year following he ſent him into Germany, to ſearch the archives and libraries of the ancient abbeys, for what was moſt curious and proper to illuſtrate the hiſtory of the church in general, and that of France in particular. He has publiſhed an account of this journey. In 1685, he undertook another journey into Italy, by order of the king of France; and returned the year following with a very noble collection. He placed in the king's library above 3000 volumes of rare books, printed and in MSS. and compoſed two volumes of the pieces which he had diſcovered in that country. He was highly eſteemed for his virtues as well as his learning.

MACACO, or Macauco. See Lemur, Mammalia *Index*.

MACAO, a town of China, in the province of Canton, ſeated in an iſland at the mouth of the river Tae. The Portugueſe have been in poſſeſſion of the harbour for 150 years. Formerly they had a great trade here; but now they have only a fort with a ſmall garriſon. The houſes are built after the European manner; and there is a Chineſe mandarin, as well as a Portugueſe governor, to take care of the town and the neighbouring country. E. Long. 112. 13. N. Lat. 22. 12.

Macao. See Psittacus, Ornithology *Index*.

MACARIANS, in eccleſiaſtical hiſtory, the followers of Macarius, an Egyptian monk, who was di-ſignified towards the cloſe of the fourth century for his ſanctity and virtue. In his writings there are ſome ſuperſtitious tenets, and alſo certain opinions that ſeem tainted with Origeniſm. The name has been alſo applied to thoſe who adopted the ſentiments of Macarius a native of Ireland, who about the cloſe of the ninth century, propagated in France the error afterwards maintained by Averrhoes, that one individual intelligence or ſoul performed the ſpiritual and rational functions in all the human race.

MACARONI. See FOLENGIO, and the next article.

MACARONIC, or MACARONIAN, a kind of burleſque poetry, conſiſting of a jumble of words of different languages, with words of the vulgar tongue Latinized, and Latin words modernized. *Macaroni* among the Italians, as has been obſerved by Cælius Rhodiginus, ſignifies *a coarſe clowniſh man*; and becauſe this kind of poetry is patched out of ſeveral languages, and full of extravagant words, &c. the Italians, among whom it had its riſe, gave it the name of *macaronian* or *macaronic* poetry. Others chooſe to derive it *à maccaronibus*, from *macaroons*, a kind of confection made of meal not boulted, ſweet almonds, ſugar, and the white of eggs, accounted a great dainty among the country people in Italy; which, from their being compoſed of various ingredients, occaſioned this kind of poetry, which conſiſts of Latin, Italian, Spaniſh, French, Engliſh, &c. to be called by their name.

Example.—A bold fellow in the *macaronic* ſtyle, ſays,

Enflavi omnes ſcadrones et regimandos, &c.

Another example:

Archelos piſtoliferos furiamque manantum,
Et grandem eſmeutam quæ in ſpinum facta ruelle eſt:
Toxinumque alto troublantem corda clochero, &c.

Theoph. Folengius, a Benedictine monk of Mantua, was the firſt who invented, or at leaſt cultivated, this kind of verſe. See FOLENGIO.

The beſt pieces of this kind are, the *Baldus* of Folengio, and *Macaronis Forza* by Stefonio a Jeſuit, among the Italians; and the *Reatus veritabilis*, *ſuper terribili eſmeuta paiſanarum de Ruellis;* among the French. The famous Rabelais firſt transferred the *macaronic* ſtyle out of the Italian verſe into French proſe: and on the model thereof formed ſome of the beſt things in his *Pantagruel*. We have little in Engliſh in the *macaronian* way; nothing ſcarce, but ſome little looſe pieces collected in Camden's remains. But the Germans and Netherlanders have had their *macaronic* poets; witneſs the *Certamen Catholicum cum Calviniſtis*, of one Martinius Hamconius Friſius, which contains about 1200 verſes, all the words whereof begin with the letter *C*.

MACARSKA, a town of Dalmatia, and capital of Primogria, with a pretty good harbour, and a biſhop's ſee, ſeated on the gulf of Venice. E. Long. 17. 57. N. Lat. 43. 42.

MACASSAR, a conſiderable kingdom of the iſland of Celebes, in the Eaſt Indies. The climate is very hot; and would be intolerable, were it not for the rains which fall when the ſun is directly over their heads. The ſoil is extremely fertile, and there are ripe fruits at all times of the year. There are great numbers of monkies, who are devoured by monſtrous ſerpents; ſome of which are ſo large, that they will ſwallow one of theſe animals entire. The Macaſſars are large, robuſt, courageous, and greatly addicted to war. They profeſs the Mahometan religion.

MACASSAR, a large, ſtrong, and handſome town, of the iſland of Celebes, and capital of the kingdom of the ſame name, where the king reſides. The houſes are all built of wood, and ſupported by thick poſts; and they have ladders to go up into them, which they draw up as ſoon as they have entered. The roofs are covered with very large leaves, which prevent the rain from entering. It is ſeated near the mouth of a large river, which runs through the kingdom from north to ſouth. E. Long. 117. 55. S. Lat. 5. 0.

Macassar Poiſon, in *Natural Hiſtory*, called *ippo* in the Macaſſar and Malayan tongue, is the gum of a certain tree, ſhining, brittle, black, and every way like ſtone-pitch, growing in the iſland of Celebes, in the South ſeas; with which all the natives arm themſelves in travel, having a long hollow trunk of a hard red wood like braſil, accurately bored, and at one end is fixed a large lance-blade of iron. Then they make a ſmall arrow, very ſtraight, and ſomewhat bigger than a large wheaten ſtraw: at one end they fix it into a round piece of white, light, ſoft wood, like cork, about the length of the little finger, juſt fit for the bore of the trunk, to paſs clear by the force of one's breath, and to fill it ſo exactly, that the air may not paſs by, but againſt it, in order to carry it with the greater force. At the other end they fix in it either a ſmall fiſh-tooth for that purpoſe, or make a blade of wood of the bigneſs of the point of a lancet, about three-quarters of an inch long, and making a little notch in the end of the arrow, they ſtick it firm therein, which they anoint with poiſon. The poiſonous gum, when gathered, is put into hollow bamboos or canes, ſtopped up very cloſe, and thus brought to Macaſſar. When they fit it for uſe, they take a piece of ſmooth turtle-ſhell, and a ſtick cut flat and ſmooth at the end: then they take green galangal root, grate it, and with the addition of a little fair water, preſs the juice into a clean china diſh: then with a knife ſcraping a little of the poiſon upon the ſhell, dip the end of the ſtick in the forementioned liquor, and with this diſſolve the poiſon to the conſiſtence of a ſyrup: when this is done, they anoint the fiſh-tooth or wooden blade with the ſame ſtick, and lay it in the ſun, ſo that it may be baked hard. The pointed arrows thus prepared, are put in hollow bamboos, cloſe ſhut, and in this ſtate they retain their virtue for a month.

MACCABÆUS, JUDAS. See JUDAS.

MACCABEES, two apocryphal books of ſcripture, containing the hiſtory of Judas and his brothers, and their wars againſt the Syrian kings in defence of their religion and liberties, ſo called from Judas Mattathias, ſurnamed *Maccabæus*, as ſome ſay from the word מכבי, formed of the initials of מי כמכה כאלם יהוה, q. d. *Who is like unto thee, O Lord, among the gods;* which was the motto of his ſtandard; whence thoſe who fought under his ſtandard were called *Maccabees*, and the name was generally applied to all who ſuffered in the cauſe

Maccabees, Macbeth. of the true religion, under the Egyptian or Syrian kings. The firſt book of the Maccabees is an excellent hiſtory, and comes neareſt to the ſtyle and manner of the ſacred hiſtorians of any extant. It was written originally in the Chaldee language, of the Jeruſalem dialect, and was extant in this language in the time of Jerome. From the Chaldee it was tranſlated into Greek, from the Greek into Latin. It is ſuppoſed to have been written by John Hyrcanus the ſon of Simon, who was prince and high prieſt of the Jews near 50 years, and began his government at the time where this hiſtory ends. It contains the hiſtory of 40 years, from the reign of Antiochus Epiphanes to the death of Simon the high prieſt: that is, from the year of the world 3829 to the year 3869; 131 years before Chriſt. The ſecond book of the Maccabees begins with two epiſtles ſent from the Jews of Jeruſalem to the Jews of Egypt and Alexandria; to exhort them to obſerve the feaſt of the dedication of the new altar erected by Judas on his purifying the temple. The firſt was written in the 169th year of the era of the Seleucidæ, i. e. before Chriſt 144; and the ſecond in the 188th year of the ſame era, or 125 before Chriſt; and both appear to be ſpurious. After theſe epiſtles follows the preface of the author to his hiſtory, which is an abridgement of a larger work, compoſed by one Jaſon, a Jew of Cyrene, who wrote in Greek the hiſtory of Judas Maccabeus and his brethren, and the wars againſt Antiochus Epiphanes, and Eupator his ſon. The ſecond book does not by any means equal the accuracy and excellency of the firſt. It contains a hiſtory of about 15 years, from the execution of Heliodorus's commiſſion, who was ſent by Seleucus to fetch away the treaſures of the temple, to the victory obtained by Judas Maccabeus over Nicanor; that is, from the year of the world 3828, to the year 3843, 147 years before Chriſt.

There are in the Polyglot Bibles, both of Paris and London, Syriac verſions of both theſe books; but they, as well as the Engliſh verſions which we have among the apocryphal writers in our Bibles, are derived from the Greek. There is alſo a third book of the Maccabees, containing the hiſtory of the perſecution of Ptolemy Philopator againſt the Jews in Egypt, and their ſufferings under it; which ſeems to have been written by ſome Alexandrian Jew in the Greek language, not long after the time of Siracides. It is in moſt of the ancient manuſcript copies of the Greek Septuagaint; particularly in the Alexandrian and Vatican, but was never inſerted into the vulgar Latin verſion of the Bible, nor conſequently into any of our Engliſh copies. Moreover, Joſephus's hiſtory of the martyrs that ſuffered under Antiochus Epiphanes, is found in ſome manuſcript Greek Bibles, under the name of the fourth book of the *Maccabees.*

MACBETH, a Scots nobleman in the 11th century, nearly allied to Duncan king of Scotland.—Not contented with curbing the king's authority, he carried his peſtilent ambition ſo far as to put him to death; and, chaſing Malcolm Canmore his ſon and heir into England, uſurped the crown. Siward earl of Northumberland, whoſe daughter Duncan had married, undertook, by the order of Edward the Confeſſor, the protection of the fugitive prince.—He marched with an army into Scotland; defeated and killed Macbeth: and reſtored Malcolm to the throne of his anceſtors. Shakeſpeare has made this tranſaction the ſubject of one of his beſt tragedies.

Macbride.

MACBRIDE, Dr David, an eminent phyſician and philoſopher, was deſcended from an ancient family in the county of Galloway in Scotland. His grandfather, a clergyman, had ſettled in Ireland about the end of the laſt century, as miniſter to a Preſbyterian congregation at Belfaſt; and his father, who followed the ſame line, was ſettled at Ballymony in the county of Antrim, where he married, and where our author was born in April 1726. After a proper ſchool-education, and having paſſed ſome time under the tuition of an eminent ſurgeon in his native place, he was ſent to the univerſity of Glaſgow. Having there completed the uſual courſe of academical ſtudies, he came to Edinburgh for the further proſecution of medical ſcience. After a ſhort ſtay here, a war then prevailing between France and Britain, he was induced to go on board the navy in the ſtation of a ſurgeon's mate. In the ſervice of his country he continued for ſeveral years; and after diſcharging for ſome time the duties of an aſſiſtant, he was raiſed to the rank of ſurgeon. In this ſituation, he firſt turned his thoughts towards the diſcovery of a remedy for the ſea-ſcurvy. It was not, however, at this period, that either chance or reaſoning ſuggeſted to him the employment of an article which has ſince been attended with the moſt beneficial conſequences. Here he had an opportunity only of obſerving the ſymptoms, of ſtudying the nature, and of lamenting the conſequences, of the diſeaſe.

The termination of the war by the peace of Aix-la-Chapelle put a period to Dr Macbride's employment as a naval ſurgeon. He had now probably obtained much medical knowledge in the ſchool of experience; but he was ſenſible that he had ſtill much to acquire in that of ſcience. An ardent keenneſs to mingle in active life had led him from the ſchools of medicine at an earlier period than could have been wiſhed; and an earneſt deſire to found his future practice in the beſt eſtabliſhed principles led him back to them, when a judgement, matured by years, and informed from the obſervation of facts, rendered him capable of hearing teachers with greater advantage. He returned therefore to Edinburgh, and again entered on the career of academical purſuits, under the tuition of Dr Monro, and thoſe other teachers, whoſe abilities raiſed the fame of the medical ſchool at this place. But not ſatisfied with the inſtructions to be had from any one ſet of profeſſors, the celebrity of the medical teachers in London led him alſo to viſit that capital. There he particularly became the pupil of thoſe diſtinguiſhed lecturers, Dr Hunter and Dr Smellie. And while from the former he laboured to acquire an accurate chirurgical knowledge, from the latter he endeavoured to obtain the true principles of midwifery conſidered as a ſcience. At the ſame time he was no leſs induſtrious in improving himſelf in the ſucceſsful practice of both arts by attention at hoſpitals.

Thus prepared for the exerciſe of his profeſſion, about the end of the year 1749 he fixed his reſidence in Dublin in the character of ſurgeon and accoucheur. If amiable manners, and extenſive knowledge of his profeſſion, could alone have been ſufficient introductions to practice, he might in a ſhort time have look-

Macbride.

ed for a competent ſhare of buſineſs in that capital; but while he had to combat that objection which very generally ariſes from youth, his progreſs was alſo not a little retarded by an uncommon degree of modeſty. Hence for ſeveral years he remained almoſt in a ſtate of obſcurity, and was employed by but few people either of rank or fortune. But, if it is to be regretted that for many years his time was not ſo fully employed in the lucrative part of his profeſſion as was due to his merit, it ought ſtill to be remembered, that this eſſentially promoted the cauſe of ſcience: for by this means his genius and induſtry were directed to medical reſearches; and were productive of diſcoveries which will with honour tranſmit his name to lateſt poſterity. Theſe, though ſome of them might have been ſucceſsfully turned to his own emolument, were freely communicated to the world in different publications; and he did not ſhow greater ingenuity in making diſcoveries, than liberality of ſentiment in publiſhing them for the advantage of others.—His firſt publication, entitled, "Experimental Eſſays on Medical and Philoſophical Subjects," made its appearance in the year 1764.—Theſe eſſays are five in number: 1. On the fermentation of alimentary mixture and the digeſtion of the food. 2. On the nature and properties of fixed air. 3. On the different kinds of antiſeptics. 4. Of the diſſolvent power of quicklime. 5. Of the ſea-ſcurvy. The merit of all theſe is ſufficiently known and acknowledged: but the laſt of them is unqueſtionably the moſt important; the method therein propoſed of both the prevention and cure of that dreadful diſeaſe, the ſcurvy, having been confirmed by repeated and undeniable obſervation.

Having thus equally diſtinguiſhed himſelf as an ingenious philoſopher and able practitioner, the world were not now ſlow in beſtowing upon him the tribute of applauſe to which he was entitled. His name was enrolled with honour in the liſts of many learned ſocieties; and the univerſity where his ſtudies had firſt been commenced, were proud to confer upon him the degree of doctor of medicine.

The reputation, however, of being a diſtinguiſhed author, was to him but a ſecondary object; and his talents were not confined to the advancement of medicine alone. Having ſucceſsfully diſcovered a conſiderable improvement in the art of tanning, with that ſpirited generoſity which is ever the concomitant of real worth, he ſpeedily and freely communicated it to the public, by publiſhing, firſt, "An Account of a New Method of Tanning;" and afterwards, "Inſtructions for carrying on the New Method of Tanning." As a mark of approbation for this liberal conduct, as well as a teſtimony of reſpect for his ingenuity, prize-medals were conferred upon him by the Societies of Arts both in London and Dublin. But his laſt and moſt extenſive publication was more immediately in the line of his own profeſſion: It is entitled, "A Methodical Introduction to the Theory and Practice of Medicine." In that valuable work he has given a conciſe and connected view of the principles and practice of the healing art, as beſt eſtabliſhed by ſound reaſon, and confirmed by accurate obſervation. Moſt, if not all, of theſe publications, not only went through various editions, but were tranſlated into different languages.

After the merit of Dr Macbride came to be properly known, the public ſeemed to ſhow a deſire of making compenſation for having ſo long overlooked it. His employment increaſed ſo rapidly, that he had more buſineſs than he could tranſact either with eaſe or ſafety. This having kept him in perpetual agitation both of body and mind, at laſt induced an almoſt total incapacity of ſleeping. From this circumſtance his health could not fail to be impaired. In this ſituation, after accidental expoſure to cold, he was attacked with a fever, which put an end to his life on the 13th of December 1778, in the 53d year of his age.

Macbride ‖ Mace.

Thoſe who were his moſt intimate acquaintance were inclined to believe that his death was not a little haſtened by domeſtic calamities. During his reſidence in Dublin he was twice married, and was as often ſubjected to that inexpreſſible diſtreſs which muſt reſult from a final ſeparation in this world from the moſt intimate and loving friends. By both of his wives he had ſeveral children; but none of them ſurvived their father. And on theſe calamitous events, although he was able to conceal his feelings from the world, yet they gave a ſevere ſhock to his conſtitution. After his death, ſeveral of the playful trinkets of his infants, with the ſignature of *dulces exuviæ*, were found in his repoſitories among papers on medical and other important ſubjects: an incontrovertible proof, that in him at leaſt, the great mind of the philoſopher was conjoined with the feeling heart of the affectionate father. But if his abilities were remarkable as a philoſopher and phyſician, if his conduct was exemplary as a huſband and parent, his manners were no leſs amiable as a companion and friend. His polite and benevolent conduct, joined to his taſte for the fine arts, conciliated the affections and eſteem of all who knew him. His death was univerſally and ſincerely lamented in the city of Dublin.

MACCLESFIELD, a town of Cheſhire in England, 171 miles from London, is ſeated on the edge of a foreſt of the ſame name, upon a high bank near the river Bollin; and is a large handſome town, with a fine church and a very high ſteeple. It was erected into a borough by King Edward III. is governed by a mayor, and enjoys great privileges and juriſdictions by virtue of the court and the liberties of the foreſt. In its church are two braſs plates, on one of which there is a promiſe of 26,000 years and 26 days pardon for ſaying five Pater-Noſters and five Aves. Its chief manufacture is mohair buttons. In Macclesfield foreſt are many pits dug for the ſake of the turf; in which it is common to find fir-trees buried, which are dug up for various uſes, but chiefly for ſplinters that ſerve the poor for candles. W. Long. 2. 10. N. Lat. 53. 15.

MACE, an ancient weapon, formerly much uſed by the cavalry of all nations. It was commonly made of iron; its figure much reſembles a chocolate mill; many ſpecimens may be ſeen in the Tower. It was with one of theſe that Walworth mayor of London knocked the rebel Wat Tyler from off his horſe in Smithfield for approaching the young King Richard II. in an inſolent manner; and as he fell, he diſpatched him with his dagger. The mace in modern times changed its form; and being no longer a war inſtrument, is made of copper or ſilver gilt, ornamented with a crown, globe, and cross, and is now the chief ensign of authority throughout Great Britain. Similar to the ancient maces, were those staves at the end of which iron or leaden balls armed with spikes were suspended by chains: they were till lately carried by the pioneers of the trained bands or city militia.

Mace, in the *Materia Medica*, the ſecond coat or covering of the kernel of the nutmeg, is a thin, membraneous ſubſtance, of a yellowish colour: being met with in flakes of an inch or more in length, which are divided into a multitude of ramifications. It is of an extremely fragrant, aromatic, and agreeable flavour; and of a pleaſant, but acrid oleaginous taſte. See Materia Medica *Index*.

MACEDON, or Macedonia, a moſt celebrated kingdom of antiquity, was bounded on the eaſt by the Ægean ſea; on the ſouth by Theſſaly and Epirus; on the weſt by the Ionian ſea or Adriatic; on the north, at firſt by the river Strymon and the Scardian mountains, but afterwards by the river Neſſus or Neſtus. In a direct line the whole country extended only 150 miles in length; but the windings of the coaſt lengthened it out to three times that extent; in which almoſt every convenient ſituation was occupied by a Grecian ſea-port. The country was naturally divided by the Thermaic and Strymonic gulfs, into the provinces of Pieria, Chalcis, and Pangæus. The middle region, which took its name from a city of Eubœa from whence it was originally peopled, was very fertile and pleaſant; the inland country, being diverſified by lakes, rivers, and arms of the ſea, was extremely convenient for inland navigation, while the towns of Amphipolis, Potidæa, Acanthus, and many others, afforded marts for the commerce of the republics of Greece, as well as of Thrace and Macedon. On one ſide of this diſtrict were the mountains of Pangæus, and on the other the plains of Pieria. The Pangæan mountains, which extended 90 miles towards the eaſt and the river Neſſus, though proper neither for corn nor paſture, produced plenty of timber for ſhip-building; while the ſouthern branches of the mountains contained rich veins of gold and ſilver; but theſe, though wrought ſucceſſively by the Thaſians and the Athenians, were only brought to perfection by Philip of Macedon, who extracted from them gold and ſilver to the value of 200,000l. ſterling annually. Pieria extended 50 miles along the Thermaic gulf, to the confines of Theſſaly and Mount Pindus. The inland part of the country was beautifully diverſified with ſhady hills and fountains; and ſo admirably calculated for ſolitary walks and retirement, that the ancients looked upon it to be the favourite haunt of the Muſes, and accordingly beſtowed upon them the title of *Pierides*.

1 Situation and extent of the country.

2 Different names.

In the moſt early times this country was called *Æmathia*, from *Æmathius* one of its princes. The name of *Macedon* is ſaid to have been derived from *Macedo* a deſcendant of Deucalion; though others ſuppoſe it to have been only a corruption of *Mygdonia* a diſtrict of the country. In thoſe remote ages of antiquity, Macedon, like moſt other countries of Europe, was divided into a great number of petty principalities, of which ſcarce even the names are known at this time. All authors agree, however, that *Caranus* was the firſt who eſtabliſhed any permanent ſovereignty in Macedon. He was an Argive, and deſcendant of Hercules, and about 800 years B. C. led a ſmall colony of his countrymen into the inland diſtrict of Macedon, at that time diſtinguiſhed by the name of *Æmathia* as already mentioned. This territory was about 300 miles in circumference. On the ſouth it was ſeparated from the ſea by a number of Greek republics, of which the moſt conſiderable were thoſe of Olynthus and Amphipolis; and on the north, eaſt, and weſt, was ſurrounded by the barbarous kingdoms of Thrace, Pæonia, and Illyricum. According to the traditions of thoſe times, Caranus, having conſulted the oracle on the ſucceſs of his intended expedition, was commanded to be directed by the goats in the eſtabliſhment of his empire. For ſome time he proceeded at random, without knowing what to make of the oracle's anſwer; but happening to enter the ſmall kingdom of *Æmathia*, at that time governed by King Midas, he obſerved a herd of goats running towards *Edeſſa* the capital. Recollecting then the anſwer of the oracle, he attacked and took the city by ſurpriſe, ſoon after making himſelf maſter of the whole kingdom. In memory of this remarkable event he called the city *Ægea*, and the people *Ægiates*, from the goats who conducted him, and made uſe of the figure of a goat in his ſtandard. From this fable alſo we ſee why the figure of a goat is ſo frequently ſeen on the coins of Philip and his ſucceſſors.

3 Kingdom founded by Caranus.

4 [illegible] this prince.

The little colony of Argives led into Æmathia by Caranus would ſoon have been overwhelmed by the barbarous nations who ſurrounded it, had not this prince and his ſubjects taken care to ingratiate themſelves with their neighbours, rather than to attempt to ſubdue them by force of arms. They inſtructed them in the Grecian religion and government, and in the knowledge of many uſeful arts; adopting themſelves, in ſome degree, the language and manners of the barbarians; imparting to them in return ſome part of the Grecian civilization and polite behaviour. Thus they gradually aſſociated with the fierce and warlike tribes in their neighbourhood; and this prudent conduct, being followed by ſucceeding generations, may be looked upon as one of the cauſes of the Macedonian greatneſs.

5 Perdiccas I. a celebrated monarch.

Caranus, dying after a reign of three years, left the kingdom to his ſon Cœnus; who having conſiderably enlarged his dominions, was ſucceeded by Thurymas, and he by Perdiccas I. This laſt prince is by Thucydides and Herodotus accounted the founder of the Macedonian monarchy; though his hiſtory is ſo obſcured by fable, that nothing certain can now be known concerning it. In proceſs of time, however, the good underſtanding which had ſubſiſted between the Macedonians and their barbarous neighbours began to ſuffer an interruption; and in 691 B. C. the kingdom was for the firſt time invaded by the Illyrians. At firſt they did conſiderable damage by their ravages; but the Macedonian monarch, Argæus, having decoyed them into an ambuſh, cut off great numbers, and obliged the remainder to leave the kingdom. In the reigns of his ſucceſſors, however, they returned, and occaſionally proved very troubleſome enemies till the reigns of Philip and Alexander.

6 Invaſion by the Illyrians.

7 Interference of the

In the mean time the kingdom of Macedon began to be affected by thoſe great events which took place in other parts of the world. Cyrus having overthrown [illegible] the Babylonian empire, and conquered all the weſtern part of Aſia, eſtabliſhed a mighty monarchy, which threatened all the eaſtern parts of Europe with ſubjugation. The Greeks, however, having now emerged from their barbariſm, and acquired great knowledge in the art of war, were able to reſiſt effectually this very formidable power; but the kingdom of Macedon, obſcure and unconnected, was obliged to yield, and though not formally made a province of the Perſian empire, was nevertheleſs accounted in ſome ſort as under the vaſſalage and protection of the Perſians. Alcetas, who aſcended the Macedonian throne about the time that the Perſian monarchy was founded, had the dexterity to preſerve his dominions from the encroachments of the Greeks on the one hand, and of the Perſians on the other; but in the reign of his ſucceſſor Amyntas, a formal demand was made of ſubmiſſion to the great king Darius, by ſending him a preſent of earth and water. Seven ambaſſadors were ſent on this errand by Megabizus, one of the officers of Darius. They were ſumptuouſly entertained by Amyntas; but having attempted to take ſome indecent liberties with the Macedonian women, Alexander the king's ſon cauſed them all to be murdered. This raſh action had almoſt proved the ruin of the kingdom; but Alexander found means to pacify Bubaris the general ſent againſt him by Megabizus, by ſhowing him his ſiſter Gygæa, a very beautiful woman, with whom the Perſian fell in love at firſt ſight, and afterwards married her.

8
Advantages accruing to Macedon from this interference.

From this time the Macedonians were accounted the faithful allies of the Perſians; and, through the intereſt of his ſon-in-law, Amyntas obtained the country in the neighbourhood of Mount Hæmus and Olympus, at the ſame time that the city of Alabanda in Phrygia was given to Amyntas the nephew of Alexander. The Macedonians diſtinguiſhed themſelves in the time of the Perſian invaſion of Greece, by furniſhing their allies with 200,000 recruits; though ſome cities, particularly Potidæa, Olynthus, and Pallene, adhered to the Grecian intereſt. The two laſt were taken and raſed, and the inhabitants maſſacred by the Perſians; but Potidæa eſcaped by reaſon of the ſea breaking into the Perſian camp, where it did great damage. Alexander, however, afterwards thought proper to court the favour of the Greeks by giving them intelligence of the time when Mardonius deſigned to attack them. The remaining tranſactions of this reign are entirely unknown, farther than that he enlarged his dominions to the river Neſſus on the eaſt and the Axius on the weſt.

9
Reign of Perdiccas II.

Alexander I. was ſucceeded by his ſon Perdiccas II. who, according to Dr Gillies, "inherited his father's abilities, though not his integrity." But from his duplicity above mentioned both to Greeks and Perſians, it does not appear that he had much to boaſt of as to the latter quality. In the Peloponneſian war he eſpouſed the cauſe of the Spartans againſt the Athenians, from whom he was in danger by reaſon of their numerous ſettlements on the Macedonian coaſt, and their great power by ſea. For ſome time, however, he amuſed the Athenians with a ſhow of friendſhip; but at laſt, under pretence of enabling Olynthus and ſome other cities to recover their liberties, he aſſiſted in deſtroying the influence of the Athenians in thoſe places, in hopes of eſtabliſhing that of the Macedonians in its ſtead. But this deſign failed of ſucceſs; the Olynthian confederacy was broken, and the members of it became ſubject to Sparta, until at laſt, by the misfortunes of that republic, they became ſufficiently powerful not only to reſiſt the encroachments of the Macedonians, but to make conſiderable conqueſts in their country.

10
Of Archelaus I.

Perdiccas II. was ſucceeded about 416 B. C. by Archelaus I. He enlarged his dominions by the conqueſt of Pydna, and other places in Pieria, though his ambition ſeems rather to have been to improve his dominions than greatly to extend them. He facilitated the communication between the principal towns of Macedon, by cutting ſtraight roads through moſt part of the country: he built walls and fortreſſes in ſuch places as afforded a favourable ſituation; encouraged agriculture and the arts, particularly thoſe ſubſervient to war; formed magazines of arms; raiſed and diſciplined a conſiderable body of cavalry; and in a word, ſays Dr Gillies, added more to the ſolid grandeur of Macedon than had been done by all his predeceſſors put together. Nor was he regardleſs of the arts of peace. His palace was adorned by the works of Grecian painters. Euripides was long entertained at his court; Socrates was earneſtly ſolicited to live there, after the example of this philoſophic poet, formed by his precepts and cheriſhed by his friendſhip: men of merit and genius in the various walks of literature and ſcience were invited to reſide in Macedon, and treated with diſtinguiſhed regard by a monarch duly attentive to promote his own glory and the happineſs of his ſubjects."

11
The kingdom becomes a prey to civil diſſenſions.

This great monarch died after a reign of ſix years, a ſpace by far too ſhort to accompliſh the magnificent projects he had formed. After his death the kingdom fell under the power of uſurpers or weak and wicked monarchs. A number of competitors conſtantly appeared for the throne; and theſe by turns called in to their aſſiſtance the Thracians, Illyrians, Theſſalians, the Olynthian confederacy, Athens, Sparta, and Thebes. Bardyllis, an active and daring chief, who, from being head of a gang of robbers, had become ſovereign of the Illyrians, entered Macedon at the head of a numerous army, depoſed Amyntas II. the father of Philip, and ſet up in his place one Argæus, who conſented to become tributary to the Illyrians. Another candidate for the throne, named *Pauſanias*, was ſupported by the Thracians; but, by the aſſiſtance of the Theſſalians and Olynthians, Amyntas was enabled to reſume the government. After his reſtoration, however, the Olynthians refuſed to deliver up ſeveral places of importance belonging to Macedon which Amyntas had either intruſted to their care, or which they had taken from his antagoniſt. Amyntas complained to Sparta; and that republic, which had already formed ſchemes of very extenſive ambition, ſo readily complied with the requeſt, that it was generally ſuppoſed to have proceeded from Spartan emiſſaries ſent into Macedonia. They pretended indeed to heſitate a little, and to take time to deliberate on the army which ought to be raiſed for the purpoſe; but Cleigenes, the principal ambaſſador, repreſented the urgency of the caſe in ſuch a manner, that the troops which happened at that time to be ready were ordered to take the field without delay. Two thouſand Spartans, under the command

12
War with the Olynthians.

command of Eudamidas, were ordered into Macedon, while a powerful reinforcement under the command of Phœbidas, brother to the general, was ordered to follow him as ſoon as poſſible. By accident, Phœbidas and his auxiliaries were detained till the ſeaſon for action was paſſed; but Eudamidas with his ſmall army performed very eſſential ſervice. The appearance of a Spartan army at once encouraged the ſubjects and allies of the Olynthians to revolt; and the city of Potidæa, a place of great importance in the iſthmus of Pallene, ſurrendered ſoon after his arrival in the country. Being too much elated with his ſucceſs, however, Eudamidas approached ſo near the city of Olynthus, that he was unexpectedly attacked, defeated, and killed, in a ſally of the citizens. He was ſucceeded by Teleutias the brother of Ageſilaus, who had under his command a body of 10,000 men, and was farther aſſiſted by Amyntas king of Macedon, and Derdas his brother, the governor or ſovereign of the moſt weſterly province of Macedon, which abounded in cavalry. By theſe formidable enemies the Olynthians were defeated in a number of battles, obliged to ſhut themſelves up in their city, and prevented from cultivating their territory; on which Teleutias advanced with his whole forces to inveſt the city itſelf. His exceſſive eagerneſs to deſtroy his enemies proved his ruin. A body of Olynthian horſe had the boldneſs to paſs the river Amnias in ſight of the allied army, though ſo much ſuperior in number. Teleutias ordered his targeteers to attack them, the Olynthians, having retreated acroſs the river, were cloſely purſued by the Lacedemonians, great part of whom alſo paſſed the river; but the Olynthians ſuddenly turned upon them, killed upwards of 100, with Tlemonidas their leader. Teleutias, exaſperated at this diſaſter, ordered the remainder of the targeteers and cavalry to purſue; while he himſelf advanced at the head of the heavy-armed foot with ſuch celerity that they began to fall into diſorder. The Olynthians allowed them to proceed, and the Lacedemonians very imprudently advanced juſt under the towers and battlements of the city. The townſmen then mounted the walls, and diſcharged upon them a ſhower of darts, arrows, and other miſſile weapons, while the flower of the Olynthian troops, who had been purpoſely poſted behind the gates, ſallied forth and attacked them with great violence. Teleutias, attempting to rally his men, was ſlain in the firſt onſet; the Spartans who attended him were defeated, and the whole army at laſt diſperſed with great ſlaughter, and obliged to ſhelter themſelves in the towns of Acanthus, Apollonia, Spartolus, and Potidæa.

The Spartans, undiſmayed by this terrible diſaſter, next ſent their king Ageſipolis with a powerful reinforcement into Macedon. His preſence greatly raiſed the ſpirits of the Lacedemonian allies, and his rapid ſucceſs ſeemed to promiſe a ſpeedy termination to the war, when he himſelf died of a calenture. He was ſucceeded in the throne by his brother Cleombrotus, and in the command of the army by Polybiades an experienced general, who likewiſe brought along with him a powerful reinforcement. Olynthus was now completely blocked up by land, while a ſquadron of Lacedemonian galleys blocked up the neighbouring harbour of Myceberna. The Olynthians, however, held out for nine or ten months, but at last were obliged to ſubmit on very humiliating conditions. They formally renounced all claim to the dominion of Chalcis; they ceded the Macedonian cities to their ancient governor; and in conſequence of this Amyntas left the city of Ægæa or Edeſſa, where till now he had held his royal reſidence, and fixed it at Pella, a city of great ſtrength and beauty, ſituated on an eminence, which, together with a plain of conſiderable extent, was defended by impaſſable moraſſes, and by the rivers Axius and Lydias. It was diſtant about 15 miles from the Ægean ſea, with which it communicated by means of the abovementioned rivers. It was originally founded by the Greeks, who had lately conquered and peopled it; but in conſequence of the misfortunes of Olynthus, it now became the capital of Macedon, and continued ever after to be ſo.

13 The Olynthians obliged to ſubmit.

14 Pella made the capital of Macedon.

Amyntas, thus fully eſtabliſhed in his dominions, continued to enjoy tranquillity during the remaining part of his life. The reign of his ſon Alexander was ſhort, and diſturbed by invaſions of the Illyrians; from whom he was obliged to purchaſe a peace. He left behind him two brothers, Perdiccas and Philip, both very young; ſo that Pauſanias again found means to uſurp the throne, being ſupported not only by the Thracians, but a conſiderable number of Greek mercenaries, as well as a powerful party in Macedon itſelf. In this critical juncture, however, Iphicrates the Athenian happening to be on an expedition to Amphipolis, was addreſſed by Eurydice the widow of Amyntas, ſo warmly in behalf of her two ſons, whom ſhe preſented to him, that he intereſted himſelf in their behalf, and got Perdiccas the eldeſt eſtabliſhed on the throne. He was induced alſo to this piece of generoſity by the kindneſs which Eurydice and her huſband had formerly ſhown to himſelf; and he likewiſe ſaw the advantages which muſt enſue to his country from a connexion with Macedon. During the minority of the young prince, however, his brother Ptolemy, who was his guardian, openly aſpired to the throne; but he was depoſed by the Theban general Pelopidas, who reinſtated Perdiccas in his dominions; and in order to ſecure, in the moſt effectual manner, the dependence of Macedon upon Thebes, carried along with him thirty Macedonian youths as hoſtages; and among them Philip, the younger brother of the king. Perdiccas now, elated by the protection of ſuch powerful allies, forgot Iphicrates and the Athenians, and even diſputed with them the right to the city of Amphipolis, which had been decreed to them by the general council of Greece, but which his oppoſition rendered impoſſible for them to recover. In conſequence of the truſt he put in theſe new allies, alſo, it is probable that he refuſed to Bardyllis the Illyrian the tribute which the Macedonians had been obliged to pay him; which occaſioned a war with that nation. In this conteſt the Macedonians were defeated with the loſs of 4000 men, Perdiccas himſelf being taken priſoner, and dying ſoon after of his wounds.

Pauſanias [illegible] throne.

16 Ptolemy aſpires to the throne.

17 The Macedonians defeated, and their king [illegible]

The kingdom was now left in the most [illegible] ſtate. Amyntas, the proper heir to the throne, was an infant; the Thebans, [illegible] Perdiccas had placed ſo much [illegible] of Greece; the Athenians, juſtly provoked at the ungrateful [illegible] tile diſpoſition; the Illyrians ravaged the weſt, and the Pæonians the north quarter of the kingdom: the Thracians ſtill ſupported the cauſe of Pauſanias, and propoſed to ſend him into Macedon at the head of a numerous army; while Argæus, the former rival of Amyntas, renewed his pretenſions to the throne, and by flattering the Athenians with the hopes of recovering Amphipolis, eaſily induced them to ſupport his claims; and in conſequence of this they fitted out a fleet, having on board 3000 heavy-armed ſoldiers, which they ſent to the coaſt of Macedon.

18
Philip arrives in Macedon.

Philip, the late king's brother, no ſooner heard of his defeat and death, than he ſet out privately from Thebes; and on his arrival in Macedon found matters in the ſituation we have juſt now deſcribed. Fired with an inſatiable ambition, it is very probable that from the very firſt moment he had reſolved to ſeize the kingdom for himſelf; yet it was neceſſary at firſt to pretend that he aſſumed the throne only to preſerve it for his nephew. Philip, as has already been mentioned, was carried off as a hoſtage by Pelopidas, but for a long time paſt had remained in ſuch obſcurity, that hiſtorians diſagree as to his place of reſidence; ſome placing him in Thebes, and others in Macedon. It is certain, however, that from the age of 15 he had been very much in the family of Epaminondas, from whoſe leſſons he could not but derive the greateſt emolument. It is probable alſo that he attended this celebrated general in many of his expeditions; and it is certain, that, with an attendance ſuitable to his rank, he viſited moſt of the principal republics, and ſhowed an attention to their inſtitutions, both civil and military, far ſuperior to his years. Having eaſy acceſs to whomſoever he pleaſed, he cultivated the friendſhip of the firſt people in Greece. Even in Athens, where no good will ſubſiſted with Macedon, the philoſophers Plato, Iſocrates, and Ariſtotle, cultivated his acquaintance: and the connexion he formed with the principal leaders of that republic in the early period of his life, no doubt contributed greatly to the accompliſhment of the deſigns in which he afterwards proved ſo ſucceſsful.

19
Retrieves the affairs of the kingdom.

His appearance in Macedon inſtantly changed the face of affairs: the Macedonian army, though defeated, was not entirely deſtroyed; and the remainder of them ſecured themſelves in the fortreſſes which had been built by Archelaus. There were alſo conſiderable garriſons in the fortreſſes, and walled towns ſcattered over the kingdom; and the Illyrians, who had made war only for the ſake of plunder, ſoon returned home to enjoy the fruits of their victory. His other enemies, the Thracians and Pæonians, were much leſs formidable than the Illyrians, being ſtill in a very rude and uncivilized ſtate, incapable of uniting under one head in ſuch a manner as to bring any formidable army into the field. While the Illyrians therefore gave up the campaign through mere caprice and unſteadineſs, Philip himſelf applied to the Pæonians, and by fair promiſes and flattery prevailed upon them to deſiſt. The king of Thrace, by means of a ſum of money, was eaſily prevailed upon to abandon the cauſe of Pauſanias; ſo that Philip, freed from theſe barbarians, was now left at liberty to oppoſe the Athenians, who ſupported Argæus, and threatened a very formidable invaſion.

The appearance of the Athenian fleet before Methone, with that of Argæus at the head of a numerous army in Pieria, filled the whole country with conſternation; and Philip, who was by no means deficient in talents neceſſary to recommend himſelf to the good graces of the people, took the opportunity of getting Amyntas ſet aſide, and himſelf declared king; for which indeed the danger of the times afforded a very plauſible pretext. Argæus, in the mean time, advanced with his Athenian allies towards Edeſſa or Ægæ, the ancient capital of the Macedonian empire, where he hoped to have been amicably received; but finding the gates ſhut againſt him, he returned back to Methone. Philip haraſſed him in his retreat, cutting off great numbers of his men, and afterwards defeated him in a general engagement; in which Argæus himſelf, with the flower of his army, was cut in pieces, and all the reſt taken priſoners.

20
Takes upon him the ſovereignty.

21
Defeats [illegible] Argæus [illegible]

This firſt inſtance of ſucceſs contributed greatly to raiſe the ſpirits of Philip's party; and he himſelf took care to improve it in the beſt manner poſſible. Having taken a great number of priſoners, both Macedonians and Athenians, he determined, by his treatment of them, to ingratiate himſelf with both parties. The former were called into his preſence, and, after a gentle reprimand, admitted to ſwear allegiance to him; after which they were diſtributed through the army: the Athenians were entertained at his table, diſmiſſed without ranſom, and their baggage reſtored. The priſoners were juſt allowed time to return to their native city and to ſpread abroad the news of Philip's generoſity, when they were followed by ambaſſadors from Macedon with propoſals for peace. As he knew that the loſs of Amphipolis had greatly irritated them, he now thought proper to renounce his juriſdiction over that city; and it was accordingly declared free and independent, and ſubject only to the government of its own free and equitable laws. This artful conduct, together with his kind treatment of the priſoners, ſo wrought upon the minds of the Athenians, that they conſented to the renewal of a treaty which had formerly ſubſiſted between them and his father Amyntas. Thus he found means to remove all jealouſy of his ambition or the ſchemes he might afterwards undertake to their prejudice; and not only this, but to induce them to engage in a ruinous war with their allies, which occupied their attention until Philip had an opportunity of getting his matters ſo well eſtabliſhed that it was impoſſible to overthrow them.

22
Philip's politic treatment of the priſoners.

23
Renounces his right to Amphipolis.

24
Reduces the power of the nobility.

The new king being thus left at liberty to regulate his domeſtic concerns, began to circumſcribe the power of his chiefs and nobles; who, eſpecially in the more remote provinces, paid very little regard to the authority of the kings of Macedon; ſometimes, even in times of public calamity, throwing off their allegiance altogether, and aſſuming an independent government over conſiderable tracts of country. To counteract the ambition of theſe chiefs, Philip choſe a body of the braveſt Macedonian youths, whom he entertained at his own table, and honoured with many teſtimonies of his friendſhip, giving them the title of his *companions*, and allowing them conſtantly to attend him in war and hunting. Their intimacy with the ſovereign, which was conſidered as an indication of their merit, obliged them to ſuperior diligence in all the ſevere duties of military diſcipline; and the young nobility, eager to participate ſuch high honours, vied with each

25
Chooſes a number of illuſtrious young men for his companions.

other in their endeavours to gain admiſſion into this diſtinguiſhed order; ſo that while on the one hand they ſerved as hoſtages, on the other they formed an uſeful ſeminary for future generals, by whom both Philip and Alexander were afterwards greatly aſſiſted in their conqueſts.

26
Whether he inſtituted the phalanx.

Diodorus Siculus, and all the Roman writers who have treated of the hiſtory of Greece, aſſert that Philip, in the firſt year of his reign, inſtituted the Macedonian phalanx; a body of 6000 men armed with ſhort ſwords uſed either for cutting or ſtabbing, having alſo ſtrong bucklers four feet long and two and a half broad, and pikes 14 feet long; uſually marching 16 men deep. But this opinion is controverted by others. Dr Gillies ſuppoſes that the opinion had ariſen from the Romans meeting with the phalanx in its moſt complete form in Macedon; and as they became acquainted with Greece and Macedon pretty nearly at the ſame time, it was natural for them to ſuppoſe that it had been invented among the Macedonians. The phalanx, he ſays, is nothing different from the armour and arrangement which had always prevailed among the Greeks, and which Philip adopted in their moſt perfect form; "nor is there reaſon (ſays he) to think that a prince, who knew the danger of changing what the experience of ages had approved, made any alteration in the weapons or tactics of that people. The improvement in the countermarch, to which Philip gave the appearance of advancing inſtead of retreating, mentioned by Ælian in his Tactics, cap. xxviii. was borrowed, as this author tells us, from the Lacedemonians. If Philip increaſed the phalanx, uſually leſs numerous, to 6000 men, this was far from an improvement; and the latter kings of Macedon, who ſwelled it to 16,000, only rendered that order of battle more unwieldy and inconvenient." Inſtead of this, Philip, according to our author, employed himſelf in procuring arms, horſes, and other neceſſary materials for war; and in introducing a more ſevere and exact military diſcipline than had formerly been known in Macedon.

27
Overcomes the Pæonians and Illyrians.

While the king thus took the beſt methods to render himſelf ſecure at home and formidable abroad, the Pæonians again began to make incurſions into the kingdom. The death of Agis their king, however, who was a man of great military ſkill, deprived them almoſt of every power of reſiſtance when they were attacked. Philip, of conſequence, overran their country with little oppoſition, and reduced them to the ſtate of tributaries to Macedon. No ſooner was this accompliſhed, than he undertook a winter's campaign againſt the Illyrians, who had long been the natural enemies of Macedon. They had now extended their territory to the eaſt; by which means the Macedonians were excluded from the harbours on the coaſt of the Adriatic. This was a grievance to Philip, who ſeems early to have meditated the raiſing of a naval power; neither could he hope to be in ſafety, ſhould the kingdom be left open to the incurſions of a barbarous enemy; for which reaſons he determined at once to humble thoſe enemies in ſuch a manner that they ſhould no longer be in a ſituation to give him any diſturbance. After an ineffectual negociation, he was met by Bardyllis at the head of a conſiderable body of infantry, but with only 600 horſe. They made a gallant reſiſtance for ſome time; but being unable to cope with ſuch an able general as Philip, they were defeated with the loſs of 7000 men, among whom was their leader Bardyllis, who fell at the age of 90.

28
Illyrians forced to beg peace.

By this diſaſter the Illyrians were ſo much diſheartened, that they ſent ambaſſadors to Philip, humbly begging for peace on any terms. The conqueror granted them the ſame conditions which had been impoſed upon the Pæonians, viz. the becoming tributary, and yielding up to him a conſiderable part of their country. That part of it which lay to the eaſtward of a lake named Lychnidus he annexed to Macedon; and probably built a town and ſettled a colony there; the country being fertile, and the lake abounding with many kinds of fiſh highly eſteemed by the ancients. This town and lake were about 50 miles diſtant from the Ionian ſea; and ſuch was the aſcendancy which the arms and policy of Philip acquired over his neighbours, that the inhabitants of all the intermediate diſtrict ſoon adopted the language and manners of their conquerors; and their territory, hitherto unconnected with any foreign power, ſunk into ſuch abſolute dependence upon Macedon, that many ancient geographers ſuppoſed it to be a province of that country.

29
His great deſigns.

Philip had no ſooner reduced the Illyrians, than he began to put in execution greater deſigns than any he had yet attempted. The rich coaſts to the ſouthward of Macedon, inhabited chiefly by Greeks, preſented a ſtrong temptation to his ambition and avarice. The confederacy of Olynthus, after having thrown off the yoke of Sparta, was become more powerful than ever, and could ſend into the field an army of 10,000 heavy armed troops, beſides a number of cavalry in proportion. Moſt of the towns in Chalcidice were become its allies or ſubjects; ſo that this populous and wealthy province, together with Pangæus on the right and Pieria on the left, of both which the cities were either independent or ſubject to the Athenians, formed a barrier not only ſufficient to guard againſt any incurſions of the Macedonians, but which was even formidable to them. But though Philip was ſenſible enough of the importance of thoſe places, he conſidered the conqueſt of Amphipolis as more neceſſary at the preſent time.

30
Plans the conqueſt of Amphipolis.

By the poſſeſſion of this place Macedon would be connected with the ſea, and would be ſecured in many commercial advantages, which could not but contribute greatly to the proſperity of the kingdom at large; a road was likewiſe opened to the woods and mines of Pangæus, the former of which were ſo neceſſary to the raiſing of a naval power, and the latter for the eſtabliſhment of a proper military force. This city had indeed been declared independent by Philip himſelf in the beginning of his reign; but this was only to prevent a rupture with the Athenians, who ſtill aſſerted their right to it as an ancient colony; though, by reaſon of the perfidy of Charidemus, a native of Eubœa, they had hitherto failed in their attempts to recover it. The Amphipolitans, however, having once enjoyed the ſweets of liberty, prepared to maintain themſelves in their independence. In the mean time the hoſtile deſigns of Philip, which all his precaution had not been able to conceal, alarmed the inhabitants to ſuch a degree, that they thought proper to put themſelves under the protection of the Olynthians. By them they were readily received into to the confederacy; and, truſting to the ſtrength of their new allies, behaved in ſuch an inſolent manner to Philip, that he was not long of finding a ſpecious pretext for hoſtility; at which the Olynthians, greatly alarmed, ſent ambaſſadors to Athens, requeſting their aſſiſtance againſt ſuch a powerful enemy. Philip, however, juſtly alarmed at ſuch a formidable conſpiracy, ſent agents to Athens, with ſuch expedition that they arrived there before any thing could be concluded with the Olynthian deputies. Having gained over the popular leaders and orators, he deceived and flattered the magiſtrates and ſenate in ſuch an artful manner, that a negociation was inſtantly ſet on foot, by which Philip engaged to conquer Amphipolis for the Athenians, upon condition that they ſurrendered to him the ſtrong fortreſs of Pydna, a place which he repreſented as of much leſs importance to them; promiſing alſo to confer upon them many other advantages, which, however, he did not ſpecify at that time. Thus the Athenians, deceived by the perfidy of their own magiſtrates, elated with the hopes of recovering Amphipolis, and outwitted by the ſuperior policy of Philip, rejected with diſdain the proffers of the Olynthians.

31 [illegible]

The ambaſſadors of Olynthus returned home highly diſguſted with the reception they had met with; but had ſcarce time to communicate the news to their countrymen, when the ambaſſadors of Philip arrived at Olynthus. He pretended to condole with them on the affront they had received at Athens; but teſtified his ſurpriſe that they ſhould court the aſſiſtance of that diſtant and haughty republic, when they could avail themſelves of the powerful kingdom of Macedon, which wiſhed for nothing more than to enter into equal and laſting engagements with their confederacy. As a proof of his moderation and ſincerity, he offered to put them in poſſeſſion of Anthemus, an important town in the neighbourhood, of which the Macedonians had long claimed the juriſdiction, making many other fair promiſes; and among the reſt, that he would reduce for them the cities of Pydna and Potidæa, which he choſe rather to ſee in dependence on Olynthus than Athens. Thus he prevailed upon the Olynthians not only to abandon Amphipolis, but to aſſiſt him with all their power in the execution of his deſigns.

Philip now loſt no time in executing his purpoſes on Amphipolis; and preſſed the city ſo cloſely, that the people were glad to apply to the Athenians for relief. Accordingly they deſpatched two of their moſt eminent citizens, Hierax and Stratocles, to repreſent the danger of an alliance betwixt Philip and the Olynthians, and to profeſs their ſorrow for having ſo deeply offended the parent ſtate. This repreſentation had ſuch an effect, that though the Athenians were then deeply engaged in the Social war, they would probably have paid ſome attention to the Amphipolitans, had not Philip taken care to ſend them a letter with freſh aſſurances of friendſhip, acknowledging their right to Amphipolis, and which he hoped ſhortly to put into their hands in terms of his recent agreement. By theſe ſpecious pretences the Athenians were perſuaded to pay as little regard to the deputies of the Amphipolitans as they had already done to thoſe of the Olynthians; ſo that the city, unable to defend itſelf alone againſt ſo powerful an enemy, ſurrendered at laſt at diſcretion in the year 357 B. C.

32 [illegible]

Philip ſtill proceeded in the ſame cautious and politic manner in which he had begun. Though the obſtinate defence of the Amphipolitans might have furniſhed a pretence for ſeverity, he contented himſelf with baniſhing a few of the popular leaders from whom he had moſt cauſe to dread oppoſition, treating the reſt of the inhabitants with all manner of clemency; but took care to add Amphipolis to his own dominions, from which he was determined that it never ſhould be ſeparated, notwithſtanding the promiſes he had made to the Athenians. Finding that it was not his intereſt at this time to fall out with the Olynthians, he cultivated the friendſhip of that republic with great aſſiduity; took the cities of Pydna and Potidæa, which he readily yielded to the Olynthians, though they had given him but little aſſiſtance in the reduction of theſe places. Potidæa had been garriſoned by the Athenians; and them the artful king ſent back without ranſom, lamenting the neceſſity of his affairs which obliged him, contrary to his inclination, to oppoſe their republic. Though this was rather too groſs, the Athenians at preſent were ſo much engaged with the Social war, that they had not leiſure to attend to the affairs of other nations. Philip made the beſt uſe of his time, and next projected the conqueſt of the gold mines of Thrace. That rich and fertile country was now held by one Cotys, a prince of ſuch weak intellectual faculties, that the ſuperſtition of the Greeks, into which he was newly initiated, had almoſt entirely ſubverted his reaſon; and he wandered about in queſt of the goddeſs Minerva, with whom he fancied himſelf in love. The invaſion of the Macedonians, however, awaked him from his reverie; and Cotys, finding himſelf deſtitute of other means of oppoſition, attempted to ſtop the progreſs of the enemy by a letter. To this Philip paid no regard: the Thracians were inſtantly expelled from their poſſeſſions at Crenidæ, where there were very valuable gold mines. Theſe had formerly been worked by colonies from Thaſos and Athens; but the coloniſts had long ſince been expelled by the barbarous Thracians, who knew not how to make uſe of the treaſure they were in poſſeſſion of. Philip took the trouble to deſcend into the mines himſelf, in order to inſpect the works; and having cauſed them to be repaired, planted a Macedonian colony at Crenidæ, beſtowed upon it the name of Philippi, and drew annually from the gold mines to the value of near 1000 talents, or 200,000l. ſterling; an immenſe ſum in thoſe days. The coins ſtruck here were likewiſe called Philippi.

33 Makes himſelf maſter of the gold mines of Thrace.

34 Settles the affairs of Theſſaly greatly to his advantage.

Philip having obtained this valuable acquiſition, next took upon him to ſettle the affairs of Theſſaly, where every thing was in confuſion. This country had been formerly oppreſſed by Alexander tyrant of Pheræ; after whoſe death three others appeared, viz. Tiſſiphornus, Pitholaus, and Lycophron, the brothers-in-law of Alexander, who had likewiſe murdered him. By the united efforts of the Theſſalians and Macedonians, however, theſe uſurpers were eaſily overthrown, and effectually prevented from making any diſturbances for the future; and the Theſſalians, out of a miſtaken gratitude, ſurrendered to Philip all the revenues ariſing from their fairs and towns of commerce, as well as all the conveniencies of their harbours and shipping; a concession which Philip took care to secure in the most effectual manner.

35 Marries Olympias.

Having now not only established his sovereignty in the most effectual manner, but rendered himſelf very powerful and formidable to his neighbours, Philip determined to enjoy ſome repoſe from his fatigues. Having formed an alliance with Arybbas king of Epirus, he, in the year 357 B. C. married Olympias the ſiſter of that prince; a match thought the more eligible, as the kings of Epirus were ſuppoſed to be deſcended from Achilles. The nuptials were ſolemnized at Pella with great pomp, and ſeveral months were ſpent in ſhows and diverſions; during which Philip ſhowed ſuch an extreme proneneſs to vice of every kind, as diſgraced him in the eyes of his neighbours, and moſt probably laid the foundation of his future domeſtic unhappineſs.

36 A general combination of the neighbouring princes formed againſt him.

So much was this behaviour of the Macedonian monarch taken notice of by the neighbouring ſtates, that the Pæonians and Illyrians threw off the yoke, engaging in their ſchemes the king of Thrace: and notwithſtanding the inſane ſtate of that prince, their deſigns were now carried on with more judgement than was uſual with barbarians. Philip, however, notwithſtanding his diſſipation, got warning of his danger in ſufficient time to prevent the bad conſequences which might have enſued had the confederates got time to bring their matters to a proper bearing. Early in the ſpring 356 he took the field with the flower of the Macedonian troops. Having marched in perſon againſt the Pæonians and Thracians, he deſpatched Parmenio his beſt general into Illyria. Both enterpriſes proved ſucceſsful; and while Philip returned victorious from Thrace, he received an account of the victory gained by Parmenio; a ſecond meſſenger informed him of a victory gained by his chariot at the Olympic games; and a third, that Olympias had been delivered of a ſon at Pella. This was the celebrated Alexander, to whom the diviners propheſied the higheſt proſperity and glory, as being born in ſuch auſpicious circumſtances.

37 Defeats his enemies.

38 Birth of Alexander the Great.

39 Ariſtotle appointed his preceptor.

A ſhort time after the birth of Alexander, Philip wrote a letter to the philoſopher Ariſtotle, whom he choſe for preceptor to his young ſon. The letter was written with great brevity, containing only the following words: "Know that a ſon is born to us. We thank the gods not ſo much for their gift, as for beſtowing it at a time when Ariſtotle lives. We aſſure ourſelves that you will form him a prince worthy of his father, and worthy of Macedon." He next ſet about the farther enlargement of his territories, which were already very conſiderable. Pæonia was now one of his provinces; on the eaſt his dominions extended to the ſea of Thaſos, and on the weſt to the lake Lychnidus. The Theſſalians were in effect ſubject to his juriſdiction, and the poſſeſſion of Amphipolis had ſecured him many commercial advantages; he had a numerous and well-diſciplined army, with plentiful reſources for ſupporting ſuch an armament, and carrying through the other ſchemes ſuggeſted by his ambition; though his deep and impenetrable policy rendered him more truly formidable than all theſe put together. His firſt ſcheme was the reduction of Olynthus, the moſt populous and fertile country on the borders of Macedon; after which his ambition prompted him to acquire the ſovereignty of all Greece. To accompliſh the former, he had hitherto courted the friendſhip of the Olynthians by every poſſible method; and without letting them any [illegible] to accompliſh the latter, he deprived the Athenians gradually of ſeveral of their ſettlements in Thrace and Macedon. In theſe depredations, however, he took care always to give ſuch appearance of juſtice to his actions, that his antagoniſts, who had ſtudied the matter leſs deeply, could not find a plauſible pretext for engaging in war againſt him, even when he had openly committed hoſtilities againſt them. Philip eaſily perceived that the affairs of the Greeks were coming to a criſis, and he determined to wait the event of their mutual diſſenſions. That event did not diſappoint his hopes.

40 Extent of the Macedonian territories.

41 Projects the conqueſt of Olynthus and of all Greece.

42 Account of the Phocian war.

The Phocians had violated the religion of thoſe days in a moſt extraordinary manner; they had even ploughed up the lands conſecrated to Apollo: and however they might pretend to excuſe themſelves by examples, the Amphictyons fulminated a decree againſt the Phocians, commanding the ſacred lands to be laid waſte, and impoſing an heavy fine upon the community.

By this decree all Greece was again involved in the war called *Phocian*, from the name of the city about which it commenced. Philip at the beginning of the troubles was engaged in Thrace, where a civil war had taken place among the ſons of Cotys; and wherever Philip interfered, he was ſure to make matters turn out to his own advantage. His encroachments at length became ſo enormous, that Kerſobletes, the moſt powerful of the contending princes, agreed to cede the Thracian Cherſoneſus to the Athenians; who immediately ſent Chares at the head of a powerful armament to take poſſeſſion of it. In this expedition the town of Seſtos was taken by ſtorm, and the inhabitants cruelly treated by Chares, while Philip employed himſelf in the ſiege of Methone in Pieria. This city he likewiſe reduced; but the king loſt an eye at the ſiege in the following extraordinary manner, if we may give credit to ſome ancient hiſtorians. A celebrated archer, named After, had, it ſeems, offered his ſervices to Philip, being repreſented as ſuch an excellent markſman, that he could hit the ſwifteſt bird on the wing. Philip replied, that he would be of excellent uſe if they were to make war with ſtarlings. After, diſguſted with this reception, went over to the enemy, and with an arrow wounded the king in the eye. When the weapon was extracted, it was found to have on it the following inſcription: "For the right eye of Philip." The king ordered the arrow to be ſhot back again, with another inſcription, importing that he would cauſe After to be hanged when the town was taken. A report was raiſed after Philip's death, that he had loſt his eye by prying too narrowly into the amours of Olympias and Jupiter Ammon; which the vanity of his ſucceſſor prompted him to cheriſh, as his flatterers had probably been the inventors of it.

43 Philip loſes an eye at the ſiege of Methone.

44 Is engaged in a war with Onomarchus

All this time the Phocian war raged with the greateſt fury, and involved in it all the ſtates of Greece. Lycophron, one of the Theſſalian tyrants whom Philip had formerly deprived of his authority, had again found means to re-eſtabliſh his authority, and his countrymen having taken part with the Phocians, Lycophron called in Onomarchus the Phocian general [illegible]

protect

[illegible]

protect him against the power of Philip, by whom he was sensible that he would soon be attacked. The king accordingly marched into Theſſaly with a conſiderable army, defeated Phayllus the brother of Onomarchus, whom the latter had ſent into the country with a detachment of 7000 men. After this he beſieged and took the city of Pagaſæ, driving the enemy towards the frontiers of Phocis. Onomarchus then advanced with the whole army; and Philip, though inferior in numbers, did not decline the engagement. The Phocians at firſt gave ground, on which the Macedonians purſued, but in good order; but coming near a precipice, on the top of which Onomarchus had poſted

45 [illegible] defeats him,

a detachment of ſoldiers, the latter rolled down ſtones and fragments of the rock in ſuch a manner as did dreadful execution, and threw them into the utmoſt diſorder. Philip, however, rallied his troops with great preſence of mind, and prevented the Phocians from gaining any farther advantage than they had already done; ſaying, as he drew off his men, that they did not retreat through fear, but like rams, in order to ſtrike with the greater vigour. Nor was he long before he made good his aſſertion; for having recruited his army with the greateſt expedition, he re-

46 But at laſt defeated and killed.

turned into Theſſaly at the head of 20,000 foot and 500 horſe, where he was met by Onomarchus. The Macedonians at this time were ſuperior in number to their enemies; and Philip moreover took care to remind them, that their quarrel was that of heaven, and that their enemies had been guilty of ſacrilege, by profaning the temple of Delphi. That they might be ſtill more animated in the cauſe, he put crowns of laurel on their heads. Thus fired by enthuſiaſm, and having beſides the advantage of numbers, the Phocians were altogether unable to withſtand them. They threw away their arms and fled towards the ſea, where they expected to have been relieved by Chares, who, with the Athenian fleet, was nigh the ſhore: but in this they were diſappointed, for he made no attempt to ſave them. Upwards of 6000 periſhed in the field of battle or in the purſuit, and 3000 were taken priſoners. The body of Onomarchus being found among the ſlain, was by order of Philip hung upon a gibbet as a mark of infamy, on account of his having polluted the temple; the bodies of the reſt were thrown into the ſea, as being all partakers of the ſame crime. The fate of the priſoners is not known, by reaſon of an ambiguity in a ſentence of Diodorus Siculus, which may imply that they were drowned, though it does not expreſsly ſay ſo.

47 Philip purſues his ambitious ſchemes.

After this victory, Philip ſet about the ſettlement of Theſſaly, waiting only for an opportunity to put in execution his favourite ſcheme of invading Greece. In the mean time, he rejoiced to ſee the ſtates weakening each other by their mutual diſſenſions; of which he never failed to take advantage as far as poſſible. He now, however, began to throw off the maſk with regard to the Olynthians, whom he had long deceived with fair promiſes. Having detached Kerſobletes from the intereſt of the Athenians, he eſtabliſhed him in the ſovereignty of Thrace; not out of any good will, but with a view to deſtroy him whenever a proper opportunity offered. Were he once poſſeſſed of the dominions of that prince, the way to Byzantium was open to him; the poſſeſſion of which muſt have been a great temptation to Philip, who well knew how to value the importance of its ſituation both with reſpect to commerce and war: and in order to pave the way to this important conqueſt, he attacked the fortreſs of Heræum, a ſmall and in itſelf unimportant place, though, by reaſon of its neighbourhood to Byzantium, the acquiſition was valuable to Philip. The

Macedon.

48 [illegible] by the Athenians.

Athenians, however, at laſt began to perceive the deſigns of Philip, and determined to counteract them. For this purpoſe they entered into an alliance with Olynthus; and having warned Kerſobletes of his danger, they ordered a powerful fleet to the defence of the Heræum. But theſe vigorous meaſures were ſoon counteracted by the report of Philip's death, which had been occaſioned by his wound at Methone, and a diſtemper ariſing from the fatigues he had afterwards undergone. The inconſtant Athenians too eaſily gave credit to this report; and, as if all danger had been over with his death, diſcontinued their preparations, and directed their whole attention to the ſacred war. —This conteſt, inſtead of being ended by the death of Onomarchus, now raged with double fury. Phy-

49 [illegible] the [illegible] war.

alles, above mentioned, the only ſurviving brother of Onomarchus, undertook the cauſe of the Phocians; and his affairs becoming every day more and more deſperate, he undertook the moſt unaccountable method of retrieving them which could be imagined: having converted into ready money the moſt precious materials belonging to the temple at Delphi, and with this treaſure doubled the pay of his ſoldiers. By this new piece of ſacrilege, he indeed brought many adventurers to his ſtandard, though he cut off all hopes of mercy for himſelf or his party ſhould he be defeated. Having the aſſiſtance of 1000 Lacedæmonians, 2000 Achæans, and 5000 Athenian foot, with 400 cavalry, he was ſtill enabled to make a very formidable appearance; and the Phocians took the field with great proſpect of ſucceſs.

50 Philip [illegible] the quarrel.

Philip now thought it time to throw off the maſk entirely, for which the proceedings of the Athenians, particularly their league with Olynthus, furniſhed him with a plauſible pretext; and the revenging ſuch horrid ſacrilege as had been committed at Delphi ſeemed to give him a title to march at the head of an army into Greece. The ſuperſtition of the Greeks, however, had not yet blinded them to ſuch a degree, but they could eaſily perceive that Philip's piety was a mere pretence, and that his real deſign was to invade and conquer the whole country. The Athenians no ſooner heard of the march of the Macedonian army, than they deſpatched, with all expedition, a ſtrong guard to ſecure the paſs of Thermopylæ; ſo that Phi-

51 Is prevented from entering Greece.

lip was obliged to return greatly chagrined and diſappointed. Their next ſtep was to call an aſſembly, to deliberate upon the meaſures proper to be taken in order to reſtrain the ambition of the Macedonian monarch; and this aſſembly is rendered memorable by the firſt appearance of Demoſthenes as an orator againſt Philip. Athens for ſome time had been in a very alarming ſituation. They were deeply involved in the ſacred war; their northern poſſeſſions were continually inſulted and plundered by Philip; while a number of his mercenary partiſans drew off the public attention to ſuch a degree, that, inſtead of taking meaſures to counteract that ambitious prince, they a-

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52 [illegible] Mace-donians.

amuſed themſelves with ſpeculations about the deſigns of the Perſian monarch, who was preparing for war againſt the Cyprians, Egyptians, and Phœnicians. Iſocrates the celebrated orator, and Phocion the ſtateſman, joined the multitude in their preſent opinion, though not from any mercenary motives, but purely from a dread of the unſteady conduct of the Athenians; who, they were aſſured, could not contend with a prince of the vigour and activity of Philip; and therefore exhorted them by all means to cultivate the friendſhip of Philip, whom they could not oppoſe with any probability of ſucceſs. Iſocrates, indeed, greatly inſiſted for an expedition into Aſia, and looked upon Philip to be the only general capable of conducting it, though at preſent the Greeks had no pretence for making war upon the Perſians, but that of revenging former injuries: and on this ſubject he addreſſed a diſcourſe to Philip himſelf; and it is even ſaid, that Iſocrates, by the power of his rhetoric, prevailed upon Philip and the Athenians to lay aſide their animoſities for a ſhort time, and conſent to undertake this expedition in conjunction.

53 [illegible] them.

54 He and Phocion oppoſed by Demoſthenes.

If this coalition, however, did really take place, it was of very ſhort duration. The views of Phocion and Iſocrates were violently oppoſed by Demoſthenes. Though ſenſible of the corruption and degeneracy of his countrymen, he hoped to be able to rouſe them from their lethargy by dint of his eloquence; a talent he had been at great pains to cultivate, and in which he is ſaid to have excelled all men that ever exiſted.

55 Subſtance of his firſt diſcourſes.

In his firſt addreſſes to the people, this celebrated orator exhorted them to awake from their indolence, and to aſſume the direction of their own affairs. They had been too long governed, he ſaid, by the incapacity of a few ambitious men, to the great diſadvantage as well as diſgrace of the community. In the firſt place, an orator who had placed himſelf at the head of a faction of no more than 300 or 400, availed himſelf and his followers of the careleſſneſs and negligence of the people, to rule them at pleaſure. From a conſideration of their preſent weakneſs and corruption, as well as of the deſigns and commotions of the neighbouring powers, he adviſed them to abandon all romantic and diſtant ſchemes of ambition; and inſtead of carrying their arms into remote countries, to prepare for repelling the attacks which might be made upon their own dominions. He inſiſted alſo upon a better regulation of their finances, a more equal diſtribution of the public burdens, in proportion to the abilities of thoſe upon whom they were laid, and upon the retrenching many ſuperfluous expences. Having pointed out in a ſtrong light the vigorous conduct of Philip; and ſhown by what means he had attained to ſuch a reſpectable footing in the world, he next laid down a proper plan for their military operations. He told them, that they were not yet prepared to meet Philip in the field; they muſt begin with protecting Olynthus and the Cherſoneſus, for which it would be neceſſary to raiſe a body of 2000 light armed troops, with a due proportion of cavalry, which ought to be tranſported under a proper convoy to the iſlands of Lemnos, Thaſos, and Sciathos, in the neighbourhood of Macedon. In theſe they would enjoy all kinds of neceſſaries in abundance, and might avail themſelves of every favourable incident, to [illegible] the [illegible] the [illegible]; [illegible] incurſions of the Macedonians, or haraſs their territories. While this was going on, more vigorous preparations might be made for war at home; and it was propoſed, that only the fourth part of the Athenian citizens ſhould enliſt, and no mercenaries were admitted at preſent [illegible]. But notwithſtanding the moderation of theſe propoſals, and the urgent neceſſities of the ſtate, it was impoſſible to prevail upon the indolent and luxurious Athenians to provide for their own ſafety. They appear, indeed, at this time to have been deſperately ſunk in effeminacy and diſſipation; which diſpoſition Philip took care to encourage to the utmoſt of his power. There was an aſſembly in the city called the *Sixty*, from their conſiſting originally of that number, who met expreſsly for the purpoſes of extinguiſhing all care about public affairs, and to intoxicate themſelves with every kind of pleaſure they had in their power. With this aſſembly Philip was ſo well pleaſed, that he ſent them money to ſupport their extravagancies; and ſo effectually did they anſwer his purpoſes, that all the eloquence of Demoſthenes could not counteract the ſpeeches of orators much his inferiors when backed by Macedonian gold.

Philip himſelf, as we have already hinted, was exceſſively debauched in his private character, and the moſt ſhameful ſtories are related of him by the ancient writers, particularly by Demoſthenes. Theopompus, too, an author who flouriſhed in the time of Alexander, and was rewarded and honoured by that monarch, alſo ſpeaks of him in ſuch terms as we cannot with decency relate: but theſe accounts, coming from the avowed enemies of the king, are ſcarcely to be credited; and perhaps *policy*, as well as inclination, might contribute ſomewhat to this ſcandalous behaviour, that he might thereby recommend himſelf to the libertines of Athens, and prevent even many of the more thinking part of the people from ſuſpecting his deſigns. But in whatever exceſſes he might at times indulge himſelf, he never loſt ſight of his main object, the ſubjugation of the Greek ſtates. On pretence of being in want of money to defray the expence of his buildings, he borrowed money at a very high price throughout the whole country; and this he found an eaſy matter to do, as the diſſipation of the Delphic treaſures had rendered caſh very plentiful in Greece. Thus he attached his creditors firmly to his own intereſt; and on pretence of paying debts, was enabled without moleſtation to beſtow a number of penſions and gratuities upon the Athenian orators, who by their treacherous harangues contributed greatly to the ruin of their country; at leaſt as far as it could be ruined by ſubjection to a prince who would have obliged them to remain at peace, and apply themſelves to uſeful arts. Theſe he himſelf encouraged in a very eminent degree. The greateſt part of his time was employed at Pella, which city he adorned in the moſt magnificent manner with temples, theatres, and porticoes. He invited by liberal rewards, the moſt ingenious artiſts in Greece; and as many of theſe met with very little encouragement in their own country, great numbers flocked to him from all quarters. In the government of his people, alſo, Philip behaved with the utmoſt impartiality, liſtening with condeſcenſion to the complaints of the

[illegible]

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meaneſt of his ſubjects, and keeping up a conſtant correſpondence with thoſe whom he thought worthy of his acquaintance; from which, it is not eaſy to imagine how he could be ſo guilty of the vices we have already mentioned from ſome ancient hiſtorians.

The fate of Olynthus was now ſoon determined. This city, which held the balance of power betwixt Athens and Macedon, was taken and plundered, and the inhabitants ſold for ſlaves; but the chief hope of Philip was in putting an end to the Phocian war. For this purpoſe he affected a neutrality, that he might thereby become the arbiter of Greece. His hopes were well founded; for the Thebans, who were at the head of the league againſt the Phocians, ſolicited him on the one ſide, and the ſtates confederate with the Phocians did the like on the other. He anſwered neither, yet held both in dependence. In his heart he favoured the Thebans, or rather placed his hopes of favouring his own cauſe in that ſtate; for he well knew, that the Athenians, Spartans, and other ſtates allied with Phocis, would never allow him to paſs Thermopylæ, and lead an army into their territories. So much reſpect, however, did he ſhow to the ambaſſadors from theſe ſtates, particularly Cteſiphon and Phrynon, who came from Athens, that they believed him to be in their intereſt, and reported as much to their maſters. The Athenians, who were now diſſolved in eaſe and luxury, received this news with great ſatisfaction; and named immediately ten plenipotentiaries to go and treat of a full and laſting peace with Philip. Among theſe plenipotentiaries were Demoſthenes and Æſchines, the moſt celebrated orators in Athens. Philip gave directions that theſe ambaſſadors ſhould be treated with the utmoſt civility; naming, at the ſame time, three of his miniſters to confer with them, viz. Antipater, Parmenio, and Eurylochus. Demoſthenes being obliged to return to Athens, recommended it to his colleagues not to carry on their negociations with Philip's deputies; but to proceed with all diligence to court, there to confer with the king himſelf. The ambaſſadors, however, were ſo far from following his inſtructions, that they ſuffered themſelves to be put off for three months by the arts of Philip and his miniſters.

56
Over-reaches the Athenians, and at laſt concludes a peace.

In the mean time, the king took from the Athenians ſuch places in Thrace as might beſt cover his frontiers; giving their plenipotentiaries, in their ſtead, abundance of fair promiſes, and the ſtrongeſt aſſurances that his good will ſhould be as beneficial to them as ever their colonies had been. At laſt a peace was concluded; but then the ratification of it was deferred till Philip had poſſeſſed himſelf of Pheræa in Theſſaly, and ſaw himſelf at the head of a numerous army: then he ratified the treaty; and diſmiſſed the plenipotentiaries with aſſurances, that he would be ready at all times to give the Athenians proofs of his friendſhip. On their return to Athens, when this matter came to be debated before the people, Demoſthenes plainly told them, that, in his opinion, the promiſes of Philip ought not to be relied on, becauſe they appeared to be of little ſignificance in themſelves, and came from a prince of ſo much art, and ſo little fidelity, that th[illegible] from their maker. Æſchines, on the other hand, gave it as his ſentiment, that the king of Macedon's aſſurances ought to give them full ſatisfaction. He ſaid, that for his part, he was not politician enough to ſee any thing of diſguiſe or diſſimulation in the king's conduct; that there was great danger in diſtruſting princes; and that the ſureſt method of putting men upon deceit was to ſhow that we ſuſpected them of it. The reſt of the plenipotentiaries concurred with Æſchines; and the people, deſirous of quiet, and addicted to pleaſure, eaſily gave credit to all that was ſaid, and decreed that the peace ſhould be kept. All this was the eaſier brought about, becauſe Phocion, the worthieſt man in the republic, did not oppoſe Philip; which was owing to his having a juſt ſenſe of the ſtate his country was in. He conceived, that the Athenians of thoſe times were nothing like their anceſtors; and therefore, as he expreſſed himſelf on another occaſion, he was deſirous, ſince they would not be at the head of Greece themſelves, that they would at leaſt be upon good terms with that power which would be ſo.

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57
Paſſes Thermopylæ, and ends the Phocian war.

Philip, who knew how to uſe as well as to procure opportunity, while the Athenians were in this good humour, paſſed Thermopylæ, without their knowing whether he would fall on Phocis or Thebes; but he quickly undeceived them, by commanding his ſoldiers to put on crowns of laurel, declaring them thereby the troops of Apollo, and himſelf the lieutenant-general of that god. He then entered Phocis with an air of triumph; which ſo terrified the Phocians, whom he had cauſed to be proclaimed ſacrilegious perſons, that they immediately diſmiſſed all thoughts of defence, and without more ado ſubmitted to his mercy. Thus the Phocian war, which had ſo long employed all Greece, was ended without a ſtroke; and the judgement on the Phocians remitted to the Amphictyons, or grand council of Greece. By their decree the walls of three Phocian cities were demoliſhed, the people were forbid to inhabit in any but villages, to pay a yearly tribute of 60 talents, and never to make uſe either of houſes or arms till they had repaid to the temple of Apollo the money they had ſacrilegiouſly carried from thence. Their arms were taken from them, broken to pieces, and burnt; their double voice in the council was taken from them, and given to the Macedonians. Other orders were made for ſettling the affairs both of religion and ſtate throughout Greece: all of which were executed by Philip with great exactneſs and moderation, he paying the moſt profound reſpect to the council; and, when he had performed its commands, retiring peaceably with his army back to Macedon, which gained him great reputation.

58
Is again oppoſed by the Athenians.

At Athens alone, the juſtice and piety of Philip was not underſtood. The people began to ſee, though a little too late, that they had been abuſed and deceived by thoſe who had negociated the late peace. They ſaw that, through their acceptance of it, the Phocians were deſtroyed; that Philip was become maſter of Thermopylæ, and might enter Greece when he pleaſed; that, in abandoning their allies, they had abandoned themſelves; and that, in all probability, they might ſoon feel the weight of his power, whom they had ſo fooliſhly truſted: they therefore began to take new and hoſtile meaſures; they ordered that the women ſhould retire out of the villages into the city, their walls be repaired, and their forts new ſtrengthened.

ed. They ſeemed inclined to queſtion Philip's election into the council of the Amphictyons, becauſe it had been done without their conſent; and even to proceed to an open war. In all likelihood they had carried things to extravagancy, if Demoſthenes had not interpoſed. He told them, that though he was not for making the peace, he was however for keeping it; and that he ſaw no manner of occaſion for their entering into ſo unequal a conteſt as would needs enſue, if they took up arms, not only againſt Philip, but againſt all the ſtates concurring with him in the late tranſactions. This ſeems to have cooled the rage of the Athenians; and to have brought them to think of *ruining* Philip by degrees, as by degrees they had *raiſed* him.

59
Purſues his conqueſts in Thrace.

The fame of his achievements without the bounds of Macedon having diſpoſed the ſubjects of Philip to hope every thing from his conduct, and the ſeveral ſtates of Greece to deſire above all things his friendſhip: that prudent monarch laid hold of this favourable ſituation to fix his dominion on ſuch a ſtable foundation as that a reverſe of fortune ſhould not immediately deſtroy it. To this end, while he carried on his negociations through Greece, he likewiſe kept his army in exerciſe, by taking ſeveral places in Thrace, which terribly incommoded the Athenians. Diopithes, who had the government of the Athenian colonies in thoſe parts, perceiving well what end Philip had in view, did not ſtay for inſtructions from home; but having raiſed with much expedition a conſiderable body of troops, taking advantage of the king's being abſent with his army, entered the adjacent territories of Philip, and waſted them with fire and ſword.

60
His dominions invaded by Diopithes;

The king, who, on account of the operations of the campaign in the Cherſoneſe, was not at leiſure to repel Diopithes by force, nor indeed could divide his army without imminent hazard, choſe, like an able general, rather to abandon his provinces to inſults, which might be afterwards revenged, than, by following the dictates of an ill-timed paſſion, to hazard the loſs of his veteran army, whereon lay all his hopes. He contented himſelf, therefore, with complaining to the Athenians of Diopithes's conduct, who in a time of peace had entered his dominions, and committed ſuch devaſtations as could ſcarcely have been juſtified in a time of war. His partiſans ſupported this application with all their eloquence. They told the Athenians, that unleſs they recalled Diopithes, and brought him to a trial for this infringement of the peace, they ought not to hope either for the friendſhip of Philip or of any other prince or ſtate; neither could they juſtly complain, if, prompted by ſuch a precedent, others ſhould break faith with them, and fall without the leaſt notice upon their dominions. Demoſthenes defended Diopithes; and undertook to ſhow that he deſerved the praiſe and not the cenſure of the Athenians. Thoſe of the other party began then to charge him with crimes of a different nature; they alleged, that he oppreſſed the ſubjects and maltreated the allies of Athens. Demoſthenes replied, that of theſe things there were as yet no proofs; that when ſuch ſhould appear, a ſingle galley might be ſent to bring over Diopithes to abide their judgement, but that Philip would not come if they ſent a fleet: whence he inferred, that they ought to be cautious, and to weigh well the merits of this cauſe before they took any reſolution. He ſaid, that it was true Philip had not as yet attacked Attica, or pretended to make a deſcent on their territories in Greece, or to force his way into their ports; when it came to that, he was of opinion they would be hardly able to defend themſelves; wherefore he thought ſuch men were to be eſteemed as ſought to protect their frontiers, in order to keep Philip as long as might be at a diſtance: whereupon he moved, that, inſtead of diſowning what Diopithes had done, or directing him to diſmiſs his army, they ſhould ſend him over recruits, and ſhow the king of Macedon they knew how to protect their territories, and to maintain the dignity of their ſtate, as well as their anceſtors. Theſe arguments had ſuch an effect, that a decree was made conformable to his motion.

61
who is defended by Demoſthenes.

While affairs ſtood thus, the Illyrians recovering courage, and ſeeing Philip at ſuch a diſtance, haraſſed the frontiers of Macedon, and threatened a formidable invaſion: but Philip, by quick marches, arrived on the borders of Illyricum; and ſtruck this barbarous people with ſuch a panic, that they were glad to compound for their former depredations at the price he was pleaſed to ſet. Moſt of the Greek cities in Thrace now ſought the friendſhip of the king, and entered into a league with him for their mutual defence. As it cannot be ſuppoſed that each of theſe free cities had a power equal to that of Philip, we may therefore look upon him as their protector. About this time Philip's negociations in Peloponneſus began to come to light; the Argives and Meſſenians, growing weary of that tyrannical authority which the Spartans exerciſed over them, applied to Thebes for aſſiſtance; and the Thebans, out of their natural averſion to Sparta, ſought to open a paſſage for Philip into Peloponneſus, that, in conjunction with them, he might humble the Lacedemonians. Philip readily accepted the offer; and reſolved to procure a decree from the Amphictyons, directing the Lacedemonians to leave Argos and Meſſene free; which if they complied not with, he, as the lieutenant of the Amphictyons, might, with great appearance of juſtice, march with a body of troops to enforce their order. When Sparta had intelligence of this, ſhe immediately applied to Athens, earneſtly entreating aſſiſtance, as in the common cauſe of Greece. The Argives and Meſſenians, on the other hand, laboured aſſiduouſly to gain the Athenians to their ſide; alleging that, if they were friends to liberty, they ought to aſſiſt thoſe whoſe only aim was to be free. Demoſthenes, at this juncture, outwreſtled Philip, if we may borrow that king's expreſſion; for, by a vehement harangue, he not only determined his own citizens to become the avowed enemies of the king, but alſo made the Argives and Meſſenians not over fond of him for an ally; which when Philip perceived, he laid aſide all thoughts of this enterpriſe for the preſent, and began to practiſe in Eubœa.

62
Philip's [illegible] defeated.

This country, now called *Negropont*, is ſeparated from Greece by the Euripus, a ſtrait ſo narrow, that Eubœa might eaſily be united to the continent. This ſituation made Philip call it *the fetters of Greece*, which he therefore ſought to have in his own hands. There had been for ſome years great diſturbances in that country; under colour of which, Philip ſent forces

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thither, and demoliſhed Porthmos, the ſtrongeſt city in those parts, leaving the country under the government of three lords, whom Demoſthenes roundly calls *tyrants*, eſtabliſhed by Philip. Shortly after, the Macedonians took Oreus, which was left under the government of five magiſtrates, ſtyled alſo *tyrants* at Athens. Thither Plutarch of Eretria, one of the moſt eminent perſons in Eubœa, went to repreſent the diſtreſſes of his country, and to implore the Athenians to ſet it free. This ſuit Demoſthenes recommended warmly to the people; who ſent thither their famous leader Phocion, ſupported by formidable votes, but a very ſlender army: yet ſo well did he manage the affairs of the commonwealth and her allies, that Philip quickly found he muſt for a time abandon that project; which, however, he did not till he had formed another no leſs beneficial to himſelf, or leſs dangerous to Athens. It was the proſecution of his conqueſts in Thrace which he thought of puſhing much farther than he had hitherto done, or could be reaſonably ſuſpected to have any intention of doing.

Extraordinary preparations were made by the Macedonian monarch for this campaign. His ſon Alexander was left regent of the kingdom; and he himſelf with 30,000 men laid ſiege to Perinthus, one of the ſtrongeſt cities in the country. At preſent, however, all his arts of cajoling and pretending friendſhip were inſufficient to deceive the Athenians. They gave the command of their army and fleet to Phocion; a general of great abilities, and with whom Philip would have found it very hard to contend. On the other hand, the king of Perſia began to turn jealous of the growing power of the Macedonian monarch. The Perſian kings had been accuſtomed to regard thoſe of Macedon as their faithful allies; but the good fortune of Philip, the continual clamour of the Athenians againſt him, and his dethroning at pleaſure the petty princes of Thrace, made him now regarded in another light. When therefore he led his troops againſt Perinthus, *the Great King*, as he was ſtyled by the Greeks, ſent his letters mandatory to the governors of the maritime provinces, directing them to ſupply the place with all things in their power; in conſequence of which they filled it with troops, granted ſubſidies in ready money, and ſent beſides great convoys of proviſion and ammunition. The Byzantines alſo, ſuppoſing their own turn would be next, exerted their utmoſt endeavours for the preſervation of Perinthus; ſending thither the flower of their youth, with all other neceſſaries for an obſtinate defence. The conſequence of all this was, that Philip found himſelf obliged to raiſe the ſiege with great loſs.

63 [illegible]

That the reputation of the Macedonian arms might not ſink by this diſgrace, Philip made war on the Scythians and Triballi, both of whom he defeated; and then formed a deſign of invading Attica, though he had no fleet to tranſport his troops, and knew very well that the Theſſalians were not to be depended upon if he attempted to march through the Piſæ, and that the Thebans would even then be ready to oppoſe his march. To obviate all theſe difficulties, he had recourſe to Athens itſelf; where by means of his partiſans, he procured his old friend Æſchines to be ſent their deputy to the Amphictyons. This ſeemed a ſmall matter, and yet was the hinge on which his whole project turned. By that time Æſchines had taken his ſeat, a queſtion was ſtirred in the council, whether the Locrians of Amphiſſa had not been guilty of ſacrilege in ploughing the fields of Cyrrha in the neighbourhood of the temple of Delphi. The aſſembly being divided in their opinions, Æſchines propoſed to take a view; which was according decreed. But when the Amphictyons came in order to ſee how things ſtood, the Locrians, either jealous of their property, or ſpurred thereto by the ſuggeſtions of ſome who ſaw farther than themſelves, fell upon thoſe venerable perſons ſo rudely, that they were compelled to ſecure themſelves by flight. The Amphictyons decreed, that an army ſhould be raiſed, under the command of one of their own number, to chaſtiſe the delinquents; but as this army was to be compoſed of troops ſent from all parts of Greece, the appearance at the rendezvous was ſo inconſiderable, that the Amphictyons ſent to command them durſt undertake nothing. The whole matter being reported to the council, Æſchines, in a long and eloquent harangue, ſhowed how much the welfare and even the ſafety of Greece depended on the deference paid to their decrees; and after inveighing againſt the want of public ſpirit in ſuch as had not ſent their quotas at the time appointed by the council, he moved that they ſhould elect Philip for their general, and pray him to execute their decree. The deputies from the other ſtates, conceiving that by this expedient their reſpective conſtituents would be free from any farther trouble or expence, came into it at once; whereupon a decree was immediately drawn up, purporting that ambaſſadors ſhould be ſent to Philip of Macedon, in the name of Apollo and the Amphictyons, once more to require his aſſiſtance, and to notify to him, that the ſtates of Greece had unanimouſly choſen him their general, with full power to act as he thought fit againſt ſuch as had oppoſed the authority of the Amphictyons. Thus of a ſudden Philip acquired all that he ſought; and having an army ready in expectation of this event, he immediately marched to execute the commands of the Amphictyons in appearance, but in reality to accompliſh his own deſigns: For having paſſed into Greece with his army, inſtead of attacking the Locrians, he ſeized immediately upon Elatea, a great city of Phocis upon the river Cephiſus.

64 Is choſen general by the Amphictyons;

65 Is oppoſed by the Athenians and Thebans;

The Athenians in the mean time were in the utmoſt confuſion on the news of Philip's march. However, by the advice of Demoſthenes, they invited the Thebans to join them againſt the common enemy of Greece. Philip endeavoured as much as poſſible to prevent this confederacy from taking place; but all his efforts proved ineffectual. The Athenians raiſed an army, which marched immediately to Eleuſis, where they were joined by the Thebans. The confederates made the beſt appearance that had ever been ſeen in Greece, and the troops were exceedingly good; but unfortunately the generals were men of no conduct or ſkill in the military art. An engagement enſued at Cheronæa; wherein Alexander commanded one wing of the Macedonian army, and his father Philip the other. The confederate army was divided according to the different nations of which it conſiſted; the Athenians having the right and the Bœotians the left. In the beginning of the battle the confederates had the better; whereupon

66 whom he defeats at Cheronæa

Macedon.

upon Stratocles an Athenian commander cried out, "Come on, brother ſoldiers, let us drive them back to Macedon;" which being overheard by the king, he ſaid very coolly to one of his officers, "Theſe Athenians do not know how to conquer." Upon this he directed the files of the phalanx to be ſtraitened; and drawing his men up very cloſe, retired to a neighbouring eminence: from whence, when the Athenians were eager in their purſuit, he ruſhed down with impetuoſity, broke, and routed them with prodigious ſlaughter. The orator Demoſthenes behaved very unbecomingly in this engagement; for he deſerted his poſt, and was one of the firſt that fled: nay, we are told, that a ſtake catching hold of his robe, he, not doubting but it was an enemy, cried out, "Alas! ſpare my life."

67 Is appointed general againſt the Perſians.

This victory determined the fate of Greece; and from this time we muſt reckon Philip ſupreme lord of all the Grecian ſtates. The firſt uſe he made of his power was to convoke a general aſſembly, wherein he was recognized generaliſſimo, and with full power appointed their leader againſt the Perſians. Having, by virtue of his authority, ſettled a general peace among them, and appointed the quota that each of the ſtates ſhould furniſh for the war, he diſmiſſed them: and returning to Macedon, began to make great preparations for this new expedition. His pretence for making war on the Perſians at this time was the aſſiſtance given by the Perſians to the city of Perinthus, as already mentioned. In the mean time, however, the king by reaſon of the diſſenſions which reigned in his family, was made quite miſerable. He quarrelled with his wife Olympias to ſuch a degree, that he divorced her, and married another woman named *Cleopatra.* This produced a quarrel between him and his ſon Alexander; which alſo came to ſuch a height, that Alexander retired into Epirus with his mother. Some time afterwards, however, he was recalled, and a reconciliation took place in appearance; but in the mean time a conſpiracy was formed againſt the king's life, the circumſtances and cauſes of which are very much unknown. Certain it is, however, that it took effect, as the king was exhibiting certain ſhows in honour of his daughter's marriage with the king of Epirus. Philip, having given a public audience to the ambaſſadors of Greece, went next day in ſtate to the theatre. All the ſeats were early taken up; and the ſhows began with a ſplendid proceſſion, wherein the images of the 12 ſuperior deities of Greece were carried, as alſo the image of Philip, habited in like manner, as if he now made the 13th, at which the people ſhouted aloud. Then came the king alone, in a white robe, crowned, with his guards at a conſiderable diſtance, that the Greeks might ſee he placed his ſafety only in his confidence of the loyalty of his ſubjects. Pauſanias, the aſſaſſin, however, had fixed himſelf cloſe by the door of the theatre; and obſerving that all things fell out as he had foreſeen they would, took his opportunity when the king drew near him, and plunging his ſword in his left ſide, laid him dead at his feet. He then fled as faſt as he was able towards the place where his horſes were; and would have eſcaped, had not the twig of a vine catched his ſhoe and thrown him down. This gave time to thoſe who purſued him to come up with him; but inſtead of ſecuring him, in order to extort a diſcovery of his accomplices, they put an end to his life.

68 Is murdered.

69 His character.

With regard to the character of this monarch, it appears certain, that he was one of the moſt eminent perſons that ever ſat on a throne. Had he lived for ſome time longer, he would in all probability have ſubdued the Perſians: which was in truth leſs difficult than what he had already done. "Had that event taken place (ſays Dr Gillies), the undertakings of his long and ſucceſsful reign would have been ennobled and illuminated by the ſplendour of extenſive foreign conqueſt. Philip would have reached the height of ſuch renown as is obtained by the habits of activity, vigilance, and fortitude, in the purſuit of unbounded greatneſs; and in the opinion of poſterity, would perhaps have ſurpaſſed the glory of all kings and conquerors who either preceded or followed him. Yet, even on this ſuppoſition, there is not any man of ſenſe and probity, who, if he allows himſelf time for ſerious reflection, would purchaſe the imagined grandeur and proſperity of the king of Macedon at the price of his artifices and his crimes; and to a philoſopher, who conſidered either the means by which he had obtained his triumphs, or the probable conſequences of his dominion over Greece and Aſia, the buſy ambition of this mighty conqueror would appear but a deceitful ſcene of ſplendid miſery."

70 Extravagant joy of the Athenians.

No ſooner did the news of Philip's death reach Athens, than, as if all danger had been paſt, the inhabitants ſhowed the moſt extravagant ſigns of joy. Demoſthenes and his party put on chaplets of flowers, and behaved as if they had gained a great victory. Phocion reproved them for this madneſs; bidding them remember, that "the army which had beaten them at Cheronæa was leſſened but by one." This reproof, however, had very little effect. The people heard with pleaſure all the harſh things which the orators could ſay of the young Alexander king of Macedon, whom they repreſented as a giddy wrong-headed boy, ready to graſp all things in his imagination, and able to perform nothing. The affairs of Macedon indeed were in a very diſtracted ſtate on the acceſſion of Alexander: for all the neighbouring nations had the ſame notion of the young king with the Athenians; and being irritated by the uſurpations of Philip, immediately revolted; and the ſtates of Greece entered into a confederacy againſt him. The Perſians had been contriving to tranſfer the war into Macedon; but as ſoon as the news of Philip's death reached them, they behaved as if all danger had been over. At the ſame time Attalus, one of the Macedonian commanders, aſpired to the crown, and ſought to draw off the ſoldiers from their allegiance.

In the councils held on this occaſion, Alexander's beſt friends adviſed him rather to make uſe of diſſimulation than force, and to cajole thoſe whom they thought he could not ſubdue. Theſe advices, however, were ill ſuited to the temper of their monarch. He thought that vigorous meaſures only were proper, and therefore immediately led his army into Theſſaly. Here he harangued the princes ſo effectually, that he thoroughly gained them over to his intereſt, and was by them declared general of Greece; after which he returned to Macedon, where he cauſed Attalus to be ſeized and put to death.

71 Alexander declared general of Greece.

In the ſpring of the next year (335 B. C.) Alexander reſolved to ſubdue the Triballians and Illyrians, who inhabited the countries now called *Bulgaria* and *Sclavonia*, and had been very formidable enemies to the Macedonian power. In this expedition he diſcovered, though then but 20 years of age, a ſurpriſing degree of military knowledge. Having advanced to the paſſes of Mount Hæmus, he found that the barbarians had poſted themſelves in the moſt advantageous manner. On the tops of the cliffs, and at the head of every paſſage, they had placed their carriages and waggons in ſuch a manner as to form a kind of parapet with their ſhafts inwards, that when the Macedonians ſhould have half aſcended the rock, they might be able to puſh theſe heavy carriages down upon them. They reckoned the more upon this contrivance, becauſe of the cloſe order of the phalanx, which, they imagined, would be terribly expoſed by the ſolders wanting room to ſtir, and thereby avoid the falling waggons. But Alexander, having directed his heavy armed troops to march, gave orders, that, where the way would permit, they ſhould open to the right and left, and ſuffer the carriages to go through; but that, in the narrow paſſes, they ſhould throw themſelves on their faces with their ſhields behind them, that the carts might run over them. This had the deſired effect; and the Macedonians reached the enemies works without the loſs of a man. The diſpute was then quickly decided; the barbarians were driven from their poſts with great ſlaughter, and left behind them a conſiderable booty for the conquerors.

72
[illegible]

The next exploits of Alexander were againſt the Getæ, the Tanlantii, and ſome other nations inhabiting the country on the other ſide of the Danube. Them he alſo overcame; ſhowing in all his actions the moſt perfect ſkill in military affairs, joined with the greateſt valour. In the mean time, however, all Greece was in commotion by a report which had been confidently ſpread abroad, that the king was dead in Illyria. The Thebans, on this news, ſeized Amyntas and Timolaus, two eminent officers in the Macedonian garriſon which held their citadel, and dragged them to the market-place, where they were put to death without either form or proceſs, or any crime alleged againſt them. Alexander, however, did not ſuffer them to remain long in their miſtake. He marched with ſuch expedition, that in ſeven days he reached Pallene in Theſſaly; and in ſix days more he entered Bœotia, before the Thebans had any intelligence of his paſſing the ſtraits of Thermopylæ. Even then they would not believe that the king was alive; but inſiſted that the Macedonian army was commanded by Antipater, or by one Alexander the ſon of Æropus. The reſt of the Greeks, however, were not ſo hard of belief; and therefore ſent no aſſiſtance to the Thebans, who were thus obliged to bear the conſequences of their own folly and obſtinacy. The city was taken by ſtorm, and the inhabitants were for ſome hours maſſacred without diſtinction of age or ſex; after which the houſes were demoliſhed, all except that of Pindar the famous poet, which was ſpared out of reſpect to the merit of its owner, and becauſe he had celebrated Alexander I. king of Macedon. The lands, excepting thoſe deſtined to religious uſes, were ſhared among the ſoldiers, and all the priſoners ſold for ſlaves; by which 440 talents were brought into the king's treaſury.

73
The Thebans revolt on the news of his death.

74
Thebes taken and deſtroyed.

By this ſeverity the reſt of the Grecian ſtates were ſo thoroughly humbled, that they thought no more of making any reſiſtance, and Alexander had nothing further to hinder him from his favourite project of invading Aſia. Very little preparation was neceſſary for the Macedonian monarch, who went out as to an aſſured conqueſt, and reckoned upon being ſupplied only by the ſpoils of his enemies. Hiſtorians are not agreed as to the number of his army: Arrian ſays, that there were 30,000 foot and 5000 horſe. Diodorus Siculus tells us, that there were 13,000 Macedonian foot, 7000 of the confederate ſtates, and 5000 mercenaries. Theſe were under the command of Parmenio. Of the Odriſians, Triballians, and Illyrians, there were 5000; and of the Agrians, who were armed only with darts, 1000. As for the horſe, he tells us there were 1800 commanded by Philotas, and as many Theſſalians under the command of Callas: out of the confederate ſtates of Greece, were 600 commanded by Eurygius; and 900 Thracians and Pæonians, who led the van under Caſſander. Plutarch tells us, that, according to a low computation, he had 30,000 foot and 5000 horſe; and, according to the largeſt reckoning, he had 34,000 foot and 4000 horſe. As to his fund for the payment of the army, Ariſtobulus ſays it was but 70 talents; and Oneſicritus, who was alſo in this expedition, not only takes away the 70 talents, but affirms that the king was 200 in debt. As for proviſions, there was juſt ſufficient for a month and no more; and to prevent diſturbances, Antipater was left in Macedon with 12,000 foot and 1500 horſe.

75
Number of the army with which he invaded Aſia.

The army having aſſembled at Amphipolis, he marched from thence to the mouths of the river Strymon; then croſſing Mount Pangæus, he took the road to Abdera. Croſſing the river Ebrus, he proceeded through the country of Pætis, and in 20 days reached Seſtos; thence he came to Eleus, where he ſacrificed on the tomb of Proteſilaus, becauſe he was the firſt among the Greeks who at the ſiege of Troy ſet foot on the Aſiatic ſhore. He did this, that his landing might be more propitious than that of the hero to whom he ſacrificed, who was ſlain ſoon after. The greateſt part of the army, under the command of Parmenio, embarked at Seſtos, on board a fleet of 160 galleys of three benches of oars, beſides ſmall craft. Alexander himſelf ſailed from Eleus; and when he was in the middle of the Helleſpont, offered a bull to Neptune and the Nereids, pouring forth at the ſame time a libation from a golden cup. When he drew near the ſhore, he launched a javelin, which ſtuck in the earth: then, in complete armour, he leaped upon the ſtrand; and having erected altars to Jupiter, Minerva, and Hercules, he proceeded to Ilium. Here again he ſacrificed to Minerva; and taking down ſome arms which had hung in the temple of that goddeſs ſince the time of the Trojan war, conſecrated his own in their ſtead. He ſacrificed alſo to the ghoſt of Priam, to avert his wrath on account of the deſcent which he himſelf claimed from Achilles.

76
Sets out on his expedition.

In the mean time the Perſians had aſſembled a great army in Phrygia; among whom was one Memnon a Rhodian, the beſt officer in the ſervice of Darius. Alexander,

lexander, as ſoon as he had performed all the ceremonies which he judged neceſſary, marched directly towards the enemy. Memnon gave it as his opinion, that they ſhould burn and deſtroy all the country round, that they might deprive the Greeks of the means of ſubſiſting, and then tranſport a part of their army into Macedon. But the Perſians, depending on their cavalry, rejected this ſalutary advice; and poſted themſelves along the river Granicus, in order to wait the arrival of Alexander. In the engagement which happened on the banks of that river, the Perſians were defeated †, and Alexander became maſter of all the neighbouring country; which he immediately began to take care of, as if it had been part of his hereditary dominions. The city of Sardis was immediately delivered up; and here Alexander built a temple to Jupiter Olympius. After this, he reſtored the Epheſians to their liberty; ordered the tribute which they formerly paid to the Perſians to be applied towards the rebuilding the magnificent temple of Diana: and having ſettled the affairs of the city, marched againſt Miletus. This place was defended by Memnon with a conſiderable body of troops who had fled thither after the battle of Granicus, and therefore made a vigorous reſiſtance. The fortune of Alexander, however, prevailed; and the city was ſoon reduced, though Memnon with part of the troops eſcaped to Halicarnaſſus. After this, the king diſmiſſed his fleet, for which various reaſons have been aſſigned; though it is probable, that the chief one was to ſhow his army that their only reſource now was in ſubverting the Perſian empire.

† See *Granicus.*

77
Conſequences of his firſt victory.

Almoſt all the cities between Miletus and Halicarnaſſus ſubmitted as ſoon as they heard that the former was taken; but Halicarnaſſus, where Memnon commanded with a very numerous garriſon, made an obſtinate defence. Nothing, however, was able to reſiſt the Macedonian army. Memnon was at laſt obliged to abandon the place; upon which Alexander took and razed the city of Tralles in Phrygia; received the ſubmiſſion of ſeveral princes tributary to the Perſians; and having deſtroyed the Marmarians, a people of Lycia who had fallen upon the rear of his army, put an end to the campaign; after which he ſent home all the new married men; in obedience, it would ſeem, to a precept of the Moſaic law, and which endeared him more to his ſoldiers than any other action of his life.

As ſoon as the ſeaſon would permit, Alexander quitted the province of Phaſelus; and having ſent part of his army through the mountainous country to Perga, by a ſhort but difficult road, took his route by a certain promontory, where the way is altogether impaſſable, except when the north winds blow. At the time of the king's march the ſouth wind had held for a long time; but of a ſudden it changed, and blew from the north ſo violently, that, as he and his followers declared, they obtained a ſafe and eaſy paſſage through the Divine aſſiſtance. By many this march is held to be miraculous, and compared to that of the children of Iſrael through the Red ſea; while, on the other hand, it is the opinion of others, that there was nothing at all extraordinary in it. He continued his march towards Gordium, a city of Phrygia; the enemy having abandoned the ſtrong paſs of Telmiſſus, through which it was neceſſary for him to march. When he arrived at Gordium, and found himſelf under a neceſſity of ſtaying ſome time there till the ſeveral corps of his army could be united, he expreſſed a ſtrong deſire of ſeeing Gordius's chariot, and the famous knot in the harneſs, of which ſuch ſtrange ſtories had been publiſhed to the world. The cord in which this knot was tied, was made of the inner rind of the cornel tree; and no eye could perceive where it had begun or ended. Alexander, when he could find no poſſible way of untying, and yet was unwilling to leave it tied leſt it ſhould cauſe ſome fears in the breaſts of his ſoldiers, is ſaid by ſome authors to have cut the cords with his ſword, ſaying, "It matters not how it is undone." But Ariſtobulus aſſures us, that the king wreſted a wooden pin out of the beam of the waggon, which, being driven in acroſs the beam, held it up; and ſo took the yoke from under it. Be this as it will, however, Arrian informs us, that a great tempeſt of thunder, lightning, and rain, happening the ſucceeding night, it was held declarative of the true ſolution of this knot, and that Alexander ſhould become lord of Aſia.

78
Unties the Gordian knot.

The king having left Gordium, marched towards Cilicia; where he was attended with his uſual good fortune, the Perſians abandoning all the ſtrong paſſes as he advanced. As ſoon as he entered the province, he received advice that Arſames, whom Darius had made governor of Tarſus, was about to abandon it, and that the inhabitants were very apprehenſive that he intended to plunder them before he withdrew. To prevent this, the king marched inceſſantly, and arrived juſt in time to ſave the city. But his ſaving it had well nigh coſt him his life: for, either through the exceſſive fatigue of marching, as ſome ſay, or, according to others, by his plunging when very hot into the river Cydnus, which, as it runs through thick ſhades, has its waters exceſſively cold, he fell into ſuch a diſtemper as threatened his immediate diſſolution. His army loſt their ſpirits immediately; the generals knew not what to do; and his phyſicians were ſo much affrighted, that the terror of his death hindered them from uſing the neceſſary methods for preſerving his life. Philip the Acarnanian alone preſerved temper enough to examine the nature of the king's diſeaſe; the worſt ſymptom of which was a continual waking, and which he took off by means of a potion, and in a ſhort time the king recovered his uſual health.

79
His ſickneſs and recovery.

Soon after Alexander's recovery, he received the agreeable news that Ptolemy and Aſander had defeated the Perſian generals, and made great conqueſts on the Helleſpont; a little after that, he met the Perſian army at Iſſus, commanded by Darius himſelf. A bloody engagement enſued, in which the Perſians were defeated with great ſlaughter, as related under the article Issus. The conſequences of this victory were very advantageous to the Macedonians. Many governors of provinces and petty princes ſubmitted themſelves to the conqueror; and ſuch as did ſo were treated, not as a newly conquered people, but as his old hereditary ſubjects; being neither burdened with ſoldiers nor oppreſſed with tribute. Among the number of thoſe places which, within a ſhort ſpace after the battle of Iſſus, ſent deputies to ſubmit to the conqueror, was the city of Tyre. The king, whoſe name was [illegible] micus, was abſent in the Perſian fleet; but his ſon was among the deputies, and was very favourably received by Alexander. The king probably intended to confer particular honours on the city of Tyre; for he acquainted the inhabitants that he would come and ſacrifice to the Tyrian Hercules, the patron of their city, to whom they had erected a moſt magnificent temple. But theſe people, like moſt other trading nations, were too ſuſpicious to think of admitting ſuch an enterpriſing prince with his troops within their walls. They ſent therefore their deputies again to him, to inform him, that they were ready to do whatever he ſhould command them; but, as to his coming and ſacrificing in their city, they could not conſent to that, but were poſitively determined not to admit a ſingle Macedonian within their gates. Alexander immediately diſmiſſed their deputies in great diſpleaſure. He then aſſembled a council of war, wherein he inſiſted ſtrongly on the diſaffected ſtate of Greece (for moſt of the Grecian ſtates had ſent ambaſſadors to Darius, to enter into a league with him againſt the Macedonians), the power of the Perſians by ſea, and the folly of carrying on the war in diſtant provinces, while Tyre was left unreduced behind them: he alſo remarked, that if once this city was ſubdued, the ſovereignty of the ſea would be transferred to them, becauſe it would fix their poſſeſſion of the coaſts; and as the Perſian fleet was compoſed chiefly of tributary ſquadrons, thoſe tributaries would fight the battles, not of their late, but of their preſent maſters. For

80
Tyre taken and deſtroyed.

theſe reaſons the ſiege of Tyre was reſolved on. The town was not taken, however, without great difficulty; which provoked Alexander to ſuch a degree, that he treated the inhabitants with the greateſt cruelty. See TYRE.

After the reduction of Tyre, Alexander, though the ſeaſon was already far advanced, reſolved to make an expedition into Syria; and in his way thither propoſed to chaſtiſe the Jews, who had highly offended him during the ſiege of Tyre: for when he ſent to them to demand proviſions for his ſoldiers, they anſwered, That they were the ſubjects of Darius, and bound by oath not to ſupply his enemies. The king, however, was pacified by their ſubmiſſion; and not only pardoned them, but conferred many privileges upon them, as related under the article JEWS.

81
Egypt ſubmits.

From Jeruſalem Alexander marched directly to Gaza, the only place in that part of the world which ſtill held out for Darius. This was a very large and ſtrong city, ſituated on a high hill, about five miles from the ſea-ſhore. One *Batis* or *Betis*, an eunuch, had the government of the place; and had made every preparation neceſſary for ſuſtaining a long and obſtinate ſiege. The governor defended the place with great valour, and ſeveral times repulſed his enemies; but at laſt it was taken by ſtorm, and all the garriſon ſlain to a man; and this ſecured to Alexander an entrance into Egypt, which having before been very impatient of the Perſian yoke, admitted the Macedonians peaceably.

82
Alexander viſits the temple of Jupiter Ammon.

Here the king laid the foundations of the city of Alexandria, which for many years after continued to be the capital of the country. While he remained here, he alſo formed the extraordinary deſign of viſiting the temple of Jupiter Ammon. As to the motives by which he was induced to take this extraordinary journey, authors are not agreed; but certain it is, that he hazarded himſelf and his troops in the higheſt degree; there being two dangers in this march, which, with the example of Cambyſes, who loſt the greateſt part of his army in it, might have terrified any body but Alexander. The firſt was the want of water, which, in the ſandy deſerts ſurrounding the temple, is nowhere to be found; the other, the uncertainty of the road from the fluctuation of the ſands; which changing their ſituation every moment, leave the traveller neither a road to walk in nor mark to march by. Theſe difficulties, however, Alexander got over; though not without a miraculous interpoſition, as is pretended by all his hiſtorians.

Alexander having conſulted the oracle, and received a favourable anſwer, returned to purſue his conqueſts. Having ſettled the government of Egypt, he appointed the general rendezvous of his forces at Tyre. Here he met with ambaſſadors from Athens, requeſting him to pardon ſuch of their countrymen as he found ſerving the enemy. The king, being deſirous to oblige ſuch a famous ſtate, granted their requeſt; and ſent alſo a fleet to the coaſt of Greece, to prevent the effects of ſome commotions which had lately happened in Peloponneſus. He then directed his march to Thapſacus; and having paſſed the Euphrates and Tigris, met with Darius near Arbela, where the Perſians were again overthrown with prodigious ſlaughter †, and Alexander in effect became maſter of the Perſian empire.

† See *Arbela.*

83
Reduces Babylon, Suſa and Perſepolis.

After this important victory, Alexander marched directly to Babylon, which was immediately delivered up; the inhabitants being greatly diſaffected to the Perſian intereſt. After 30 days ſtay in this country, the king marched to Suſa, which had already ſurrendered to Philoxenus; and here he received the treaſures of the Perſian monarch, amounting, according to the moſt generally received account, to 50,000 talents. Having received alſo at this time a ſupply of 6000 foot and 500 horſe from Macedon, he ſet about reducing the nations of Media, among whom Darius was retired. He firſt reduced the Uxians, and having forced a paſſage to Perſepolis the capital of the empire, he like a barbarian deſtroyed the ſtately palace there, a pile of building not to be equalled in any part of the world; after having given up the city to be plundered by his ſoldiers. In the palace he found 120,000 talents, which he appropriated to his own uſe, and cauſed immediately to be carried away upon mules and camels; for he had ſuch an extreme averſion to the inhabitants of Perſepolis, that he determined to leave nothing valuable in the city.

84
He purſues Darius;

During the time that Alexander remained at Perſepolis, he received intelligence that Darius remained at Ecbatana the capital of Media; upon which he purſued him with the greateſt expedition, marching at the rate of near 40 miles a-day. In 15 days he reached Ecbatana, where he was informed that Darius had retired from thence five days before, with an intent to paſs into the remoteſt provinces of his empire. This put ſome ſtop to the rapid progreſs of the Macedonian army; and the king, perceiving that there was no neceſſity for hurrying himſelf and his ſoldiers in ſuch a manner, began to give the orders requiſite in the preſent ſituation of his affairs. The Theſſalian

Macedon. horſe, who had deſerved exceedingly well of him in all his battles, he diſmiſſed according to his agreement; gave them their whole pay, and ordered 2000 talents over and above to be diſtributed among them. He then declared that he would force no man: but if any were willing to ſerve him longer for pay, he deſired they would enter their names in a book, which a great many of them did; the reſt ſold their horſes, and prepared for their departure. The king appointed Epocillus to conduct them to the ſea, and aſſigned him a body of horſe as an eſcort: he likewiſe ſent Menetes with them, to take care of their embarkation, and that they were ſafely landed in Eubœa without any expence to themſelves.

On receiving freſh information concerning the ſtate of Darius's affairs, the king ſet out again in purſuit of him, advancing as far as Rhages, a city one day's journey from the Caſpian ſtraits: there he underſtood that Darius had paſſed thoſe ſtraits ſome time before; which information leaving him again without hopes, he halted for five days. Oxidates, a Perſian whom Darius had left priſoner at Suſa, was made governor of Media, while the king departed on an expedition into Parthia. The Caſpian ſtraits he paſſed immediately without oppoſition; and then gave directions to his officers to collect a quantity of proviſions ſufficient to ſerve his army on a long march through a waſted country. 85 who is murdered. But before his officers could accompliſh thoſe commands, the king received intelligence that Darius had been murdered by Beſſus, one of his own ſubjects, and governor of Bactria, as is related at length under the article PERSIA.

86 Alexander reduces Hyrcania. As ſoon as Alexander had collected his forces together, and ſettled the government of Parthia, he entered Hyrcania; and having, according to his uſual cuſtom, committed the greateſt part of his army to the care of Craterus, he, at the head of a choice body of troops, paſſed through certain craggy roads, and before the arrival of Craterus, who took an open and eaſy path, ſtruck the whole provinces with ſuch terror, that all the principal places were immediately put into his hands, and ſoon after the province of Aria alſo ſubmitted, and the king continued Satibarzanes the governor in his employment.—The reduction of this province finiſhed the conqueſt of Perſia; but the ambition of Alexander to become maſter of every nation of which he had the leaſt intelligence, induced him to enter the country of the Mardi, merely becauſe its rocks and barrenneſs had hitherto hindered any body from conquering, or indeed from attempting to conquer it. This conqueſt, however, he eaſily accompliſhed, and obliged the whole nation to ſubmit to his pleaſure. But in the mean time diſturbances began to ariſe in Alexander's new empire, and among his troops, which all his activity could not thoroughly ſuppreſs. He had ſcarcely left the province of Aria, when he received intelligence, that the traitor Beſſus had cauſed himſelf to be proclaimed king of Aſia by the name of *Artaxerxes*; and that Satibarzanes had joined him, after having maſſacred all the Macedonians who had been left in the province. Alexander appointed one *Arſaces* governor in the room of Satibarzanes; and marched thence with his army againſt the *Zarangæ*, who, under the command of Barzaentes, one of thoſe who had conſpired againſt Darius, had taken up arms, and threatened to make an obſtinate defence. Macedon. But their numbers daily falling off, Barzaentes being afraid they would purchaſe their own ſafety at the expence of his, privately withdrew from his camp, and, croſſing the river Indus, ſought ſhelter among the nations beyond it. But they, either dreading the power of Alexander, or deteſting the treachery of this Perſian towards his former maſter, ſeized and delivered him up to Alexander, who cauſed him immediately to be put to death.

87 The Macedonians give themſelves up to luxury. The immenſe treaſure which the Macedonians had acquired in the conqueſt of Perſia began now to corrupt them. The king himſelf was of a moſt generous diſpoſition, and liberally beſtowed his gifts on thoſe around him; but they made a bad uſe of his bounty, and fooliſhly indulged in thoſe vices by which the former poſſeſſors of that wealth had loſt it. The king did all in his power to diſcourage the lazy and inactive pride which now began to ſhow itſelf among his officers; but neither his diſcourſes nor his example had any conſiderable effect. The manners of his courtiers from bad became worſe, in ſpite of all he could ſay or do to prevent it; and at laſt they proceeded to cenſure his conduct, and to expreſs themſelves with ſome bitterneſs on the ſubject of his long continuance of the war, and his leading them conſtantly from one labour to another. This came to ſuch a height, that the king was at laſt obliged to uſe ſome ſeverity, in order to keep his army within the limits of their duty. 88 Alexander conforms to the Perſian cuſtoms. From this time forward, however, Alexander himſelf began to alter his conduct; and by giving a little in to the cuſtoms of the Orientals, endeavoured to ſecure that obedience from his new ſubjects which he found ſo difficult to be preſerved among his old ones. He likewiſe endeavoured, by various methods, to blend the cuſtoms of the Aſiatics and the Greeks. The form of his civil government reſembled that of the ancient Perſian kings: in the military affairs however, he preſerved the Macedonian diſcipline; but then he made choice of 30,000 boys out of the provinces, whom he cauſed to be inſtructed in the Greek language, and directed to be brought up in ſuch a manner as that from time to time he might with them fill up the phalanx. The Macedonians ſaw with great concern theſe extraordinary meaſures, which ſuited very ill with their groſs underſtandings; for they thought, after all the victories they had gained, to be abſolute lords of Aſia, and to poſſeſs not only the riches of its inhabitants, but to rule the inhabitants themſelves: whereas they now ſaw, that he never meant no ſuch thing; but that, on the contrary, he conferred governments, offices at court, and all other marks of confidence and favour, indiſcriminately both on Greeks and Perſians.—From this time alſo the king ſeems to have given inſtances of a cruelty he had never ſhown before. Philotas his moſt intimate friend was ſeized, tortured, and put to death for a conſpiracy of which it could never be proved that he was guilty: and ſoon after Parmenio and ſome others were executed without any crime at all real or alledged. Theſe things very much diſturbed the army. Some of them wrote home to Macedon of the king's ſuſpicions of his friends, and his diſpoſition to hunt out enemies at the very extremities of the world. Alexander having intercepted ſome of theſe letters, and

procured the beſt information he could concerning their authors, picked out theſe diſſatisfied people, and having diſpoſed them into a corps, gave it the title of the *turbulent battalion*; hoping by this means to prevent the ſpirit of diſaffection from pervading the whole army.

As a farther precaution againſt any future conſpiracy, Alexander thought fit to appoint Hephæſtion and Clytus generals of the auxiliary horſe; being apprehenſive, that if this authority was lodged in the hands of a ſingle perſon, it might prompt him to dangerous undertakings, and at the ſame time furniſh him with the means of carrying them into execution. To keep his forces in action, he ſuddenly marched into the country of the Euergetæ, i. e. *Benefactors;* and found them full of that kind and hoſpitable diſpoſition for which that name had been beſtowed on their anceſtors: he therefore treated them with great reſpect; and at his departure added ſome lands to their dominions, which lay contiguous, and which for that reaſon they had requeſted of him.

Turning then to the eaſt, he entered Arachoſia, the inhabitants of which ſubmitted without giving him any trouble. While he paſſed the winter in theſe parts, the king received advice, that the Arians, whom he had ſo lately ſubdued, were again up in arms, Satibarzanes being returned into that country with two thouſand horſe aſſigned him by Beſſus. Alexander inſtantly deſpatched Artabazus the Perſian, with Erigyus and Caranus, two of his commanders, with a conſiderable body of horſe and foot; he likewiſe ordered Phrataphernes, to whom he had given the government of Parthia, to accompany them. A general engagement enſued, wherein the Arians behaved very well, as long as their commander Satibarzanes lived; but he engaging Erigyus, the Macedonian ſtruck him firſt into the throat, and then, drawing forth his ſpear again, through the mouth; ſo that he immediately expired, and with him the courage of his ſoldiers, who inſtantly began to fly; whereupon Alexander's commanders made an eaſy conqueſt of the reſt of the country, and ſettled it effectually under his obedience.

89
Satibarzanes defeated and killed.

The king, notwithſtanding the inclemency of the ſeaſon, advanced into the country of Paropamiſus, ſo called from the mountain Paropamiſus, which the ſoldiers of Alexander called *Caucaſus*. Having croſſed the country in 16 days, he came at length to an opening leading into Media; which finding of a ſufficient breadth, he directed a city to be built there, which he called *Alexandria*, as alſo ſeveral other towns about a day's journey diſtant from thence: and in theſe places he left 7000 perſons, part of them ſuch as had hitherto followed his camp, and part of the mercenary ſoldiers, who, weary of continual fatigue, were content to dwell there. Having thus ſettled things in this province, ſacrificed ſolemnly to the gods, and appointed Proexes the Perſian preſident thereof with a ſmall body of troops under the command of Niloxenus to aſſiſt him, he reſumed his former deſign of penetrating into Bactria.

90
Beſſus retreated and put to death.

Beſſus, who had aſſumed the title of *Artaxerxes*, when he was aſſured that Alexander was marching towards him, immediately began to waſte all the country between Paropamiſus and the river Oxus; which river he paſſed with all his forces, and then burnt all the veſſels he had made uſe of for tranſporting them, retiring to Nautaca, a city of Sogdia; fully perſuaded, that, by the precautions he had taken, Alexander would be compelled to give over his purſuit. This conduct of his, however, diſheartened his troops, and gave the lie to all his pretenſions; for he had affected to cenſure Darius's conduct, and had charged him with cowardice, in not defending the rivers Euphrates and Tigris, whereas he now quitted the banks of the moſt defenſible river perhaps in the whole world. As to his hopes, though it cannot be ſaid they were ill founded, yet they proved abſolutely vain; for Alexander, continuing his march, notwithſtanding all the hardſhips his ſoldiers ſuſtained, reduced all Bactria under his obedience, particularly the capital Bactria and the ſtrong caſtle Aornus: in the latter he placed a garriſon under the command of Archelaus; but the government of the province he committed to Artabazus. He then continued his march to the river Oxus: on the banks of which when he arrived, he found it three quarters of a mile over, its depth more than proportionable to its breadth, its bottom ſandy, its ſtream ſo rapid as to render it almoſt unnavigable, and neither boat nor tree in its neighbourhood; ſo that the ableſt commanders in the Macedonian army were of opinon that they ſhould be obliged to march back. The king, however, having firſt ſent away, under a proper eſcort, all his infirm and worn-out ſoldiers, that they might be conducted ſafe to the ſea-ports, and from thence to Greece, deviſed a method of paſſing this river without either boat or bridge, by cauſing the hides which covered the ſoldiers tents and carriages to be ſtuffed with ſtraw, and then tied together, and thrown into the river. Having croſſed the Oxus, he marched directly towards the camp of Beſſus, where, when he arrived, he found it abandoned; but received at the ſame time letters from Spitamenes and Dataphernes, who were the chief commanders under Beſſus, ſignifying, that, if he would ſend a ſmall party to receive Beſſus, they would deliver him into his hands; which they did accordingly, and the traitor was put to death in the manner related in the hiſtory of **PERSIA**.

A ſupply of horſes being now arrived, the Macedonian cavalry were remounted. Alexander continued his march to Maracanda the capital of Sogdia, from whence he advanced to the river Iaxartes. Here he performed great exploits againſt the Scythians; from whom, however, though he overcame them, his army ſuffered much; and the revolted Sogdians being headed by Spitamenes, gave him a great deal of trouble. Here he married Roxana the daughter of Oxyartes, a prince of the country whom he had ſubdued. But during theſe expeditions, the king greatly diſguſted his army by the murder of his friend Clytus in a drunken quarrel at a banquet, and by his extravagant vanity in claiming divine honours.

91
Alexander marries Roxana.

At laſt he arrived at the river Indus, where Hephæſtion and Perdiccas had already provided a bridge of boats for the paſſage of the army. The king refreſhed his troops for 30 days in the countries on the other ſide of the river, which were thoſe of his friend and ally Taxiles, who gave him 30 elephants, and joined his army now with 700 Indian horſe, to which, when they were to enter upon action, he afterwards added 5000

92
Paſſes the Indus.

Macedon. foot. The true reaſon of this ſeems to have been his enmity to Porus, a famous Indian prince whoſe territories lay on the other ſide of the river Hydaſpes. During this receſs, the king ſacrificed with great ſolemnity, receiving alſo ambaſſadors from Ambiſurus, a very potent prince, and from Doxareas, who was likewiſe a king in thoſe parts, with tenders of their duty, and conſiderable preſents. Theſe ceremonies over, Alexander appointed Philip governor of Taxila, and put a Macedonian garriſon into the place, becauſe he intended to erect an hoſpital there for the cure of his ſick and wounded ſoldiers. He then ordered the veſſels, of which his bridge had been compoſed when he paſſed the Indus, to be taken to pieces, that they might be brought to the Hydaſpes, where he was informed that Porus with a great army lay encamped to hinder his paſſage. When he approached the banks of this river with his army and the auxiliaries under the command of Taxiles, he found that the people he had to do with were not ſo eaſily to be ſubdued as the Perſians and other Aſiatics. The Indians were not only a very tall and robuſt, but alſo a very hardy and well diſciplined people; and their king Porus was a prince of high ſpirit, invincible courage, and great conduct.

It was about the ſummer ſolſtice when Alexander reached the Hydaſpes, and conſequently its waters were broader, deeper, and more rapid, than at any other time; for in India the rivers ſwell as the ſun's increaſing heat melts the ſnow, and ſubſide again as winter approaches. Alexander therefore had every difficulty to ſtruggle with. Porus had made his diſpoſitions ſo judiciouſly, that Alexander found it impoſſible to practiſe upon him as he had done upon others, and to paſs the river in this view: wherefore he was conſtrained to divide his army into ſmall parties, and to practiſe other arts, in order to get the better of ſo vigilant a prince. To this end he cauſed a great quantity of corn and other proviſions to be brought into his camp; giving out, that he intended to remain where he was till the river fell, and by becoming fordable ſhould give him an opportunity of forcing a paſſage: this did not, however, hinder Porus from keeping up very ſtrict diſcipline in his camp; which when Alexander perceived, he frequently made ſuch motions as ſeemed to indicate a change of his reſolution, and that he had ſtill thoughts of paſſing the river. The main thing the Macedonians ſtood in fear of were the elephants; for the bank being pretty ſteep on the other ſide, and it being the nature of horſes to ſtart at the firſt appearance of thoſe animals, it was foreſeen that the army would be diſordered, and incapable of ſuſtaining the charge of Porus's troops.

93 d the ydaſpes th diffi- ity. At length Alexander paſſed the river by the following contrivance. There was, at the diſtance of 150 ſtadia from his camp, a rocky promontory projecting into the river, thick covered with wood; and overagainſt this promontory there lay a pretty large uninhabited iſland almoſt overgrown with trees. The king therefore conceived within himſelf a project of conveying a body of troops from this promontory into that iſland; and upon this ſcheme he built his hopes of ſurpriſing Porus, vigilant as he was. To this end he kept him and his army conſtantly alarmed for many nights together, till he perceived that Porus apprehended it was only done to haraſs his troops, and therefore no longer drew out of his camp, but truſted to his ordinary guards: then Alexander reſolved to put his deſign in execution. A conſiderable body of horſe, the Macedonian phalanx, with ſome [illegible] of light-armed foot, he left in his camp under the command of Craterus, as alſo the auxiliary Indians, giving theſe orders, to be obſerved in his abſence, that if Porus marched againſt him with part of his army, and left another part with the elephants behind in his camp, Craterus and his forces ſhould remain where they were; but if it ſo happened that Porus withdrew his elephants, then Craterus was to paſs the river, becauſe his cavalry might then do it ſafely. Alexander having marched half the way, or about nine of our miles, ordered the mercenary troops under the command of Attalus and other generals, to remain there; and directed them, that as ſoon as they knew he was engaged with the Indians on the other ſide, they ſhould paſs in veſſels provided for that purpoſe, in order to aſſiſt him. Then marching a long way about, that the enemy might not perceive his deſign of reaching the rock, he advanced as diligently as he could towards that poſt. It happened very fortunately for him, that a great ſtorm of thunder, lightning, and hail, roſe in the night, whereby his march was perfectly concealed, his veſſels of 30 oars put together, and his tents ſtuffed and ſtitched, ſo that they paſſed from the rock into the iſland, without being perceived, a little before break of day; the ſtorm ceaſing juſt as he and his ſoldiers were ready for their paſſage. When they had traverſed the iſland, they boldly ſet forward to gain the oppoſite ſhore in ſight of Porus's outguards, who inſtantly poſted away to give their maſter an account of the attempt. Alexander landed firſt himſelf, and was followed as expeditiouſly as poſſible by his forces, whom he took care to draw up as faſt as they arrived. When they began their march again, they found that their good fortune was not ſo great as at firſt they eſteemed it; for it appeared now, that they had not reached the continent at all, but were in truth in another iſland much larger than the former. They croſſed it as faſt as they could, and found that it was divided from the *terra firma* by a narrow channel, which, however, was ſo ſwelled by the late heavy rain, that the poor ſoldiers were obliged to wade up to the breaſt. When they were on the other ſide, the king drew them up again carefully, ordering the foot to march ſlowly, they being in number about 6000, while himſelf with 5000 horſe advanced before. As ſoon as Porus received intelligence that Alexander was actually paſſing the river, he ſent his ſon with 2000 horſe and 120 armed chariots, to oppoſe him. But they came too late: Alexander was already got on ſhore, and even on his march.

When the Macedonian ſcouts perceived them advance, they informed the king, who ſent a detachment to attack them, remaining ſtill at the head of his cavalry in expectation of Porus. But when he found that this party was unſupported, he inſtantly attacked with all his horſe, and defeated them with the ſlaughter of many, and the loſs of all their armed chariots, the ſon of Porus being ſlain in the fight. The remainder of the horſe returning to the camp with this diſaſtrous account, Porus was in ſome conſternation: however, he took very quickly the beſt and wiſeſt reſolution his circumſtances would allow, which were, 94 The ſon of Porus defeated and killed.

to leave a party of his army, with ſome of his elephants, to oppoſe Craterus, who was now about to paſs the river alſo; and, with the reſt, to march againſt Alexander and his forces, who were already paſſed. This reſolution once taken, he marched immediately out of his camp at the head of 4000 horſe, 30,000 foot, 300 chariots, and 200 elephants. He advanced as expeditiouſly as he could, till he came into a plain which was firm and ſandy, where his chariots and elephants might act to advantage: there he halted, that he might put his army in order, knowing well that he need not go in queſt of his enemy. Alexander ſoon came up with his horſe, but he did not charge Porus; on the contrary, he halted, and put his troops in order, that they might be able to defend themſelves in caſe they were attacked. When he had waited ſome time, his foot arrived; whom he immediately ſurrounded with his horſe, that, after ſo fatiguing a march, they might have time to cool and breathe themſelves, before they were led to engage. Porus permitted all this, becauſe it was not his intereſt to fight, and becauſe he depended chiefly upon his order of battle, the elephants covering his foot, ſo that the Macedonians could not charge them.

95
Porus himſelf defeated.

When Alexander had diſpoſed his foot in proper order, he placed his horſe on the wings: and, obſerving that he was much ſuperior in them to the enemy, and that the cavalry of Porus were eaſy to be charged, he reſolved to let the foot have as little ſhare as poſſible in the battle. To this end, having giving the neceſſary directions to Cœnus who commanded them, he went himſelf to the right, and with great fury fell upon the left wing of Porus. The diſpute, though ſhort, was very bloody: the cavalry of Porus, though they fought gallantly, were quickly broken; and the foot being by this means uncovered, the Macedonians charged them. But the Indian horſe rallying, came up to their relief, yet were again defeated. By this time the archers had wounded many of the elephants, and killed moſt of their riders, ſo that they did not prove leſs troubleſome and dangerous to their own ſide than to the Macedonians; whence a great confuſion enſued: and Cœnus, taking this opportunity, fell on with the troops under his command, and entirely defeated the Indian army. Porus himſelf behaved with the greateſt intrepidity, and with the moſt excellent conduct: he gave his orders and directed every thing, as long as his troops retained their form; and when they were broken, he retired from party to party as they made ſtands, and continued fighting till every corps of Indians was put to the rout. In the mean time Craterus had paſſed with the reſt of the Macedonian army; and theſe, falling upon the flying Indians, increaſed the ſlaughter of the day exceſſively, inſomuch that 20,000 foot and 3000 horſe were killed, all the chariots were hacked to pieces, and the elephants not killed were taken; two of Porus's ſons fell here, as alſo moſt of his officers of all ranks.

As for Porus, Alexander gave ſtrict directions that no injury might be done to his perſon: he even ſent Taxiles to perſuade him to ſurrender himſelf, and to aſſure him that he ſhould be treated with all the kindneſs and reſpect imaginable; but Porus, diſdaining this advice from the mouth of an old enemy, threw a javelin at him, and had killed him but for the quick turn of his horſe. Meroe the Indian, who was alſo in the ſervice of Alexander, ſucceeded better: he had been the old acquaintance of Porus; and therefore when he entreated that prince to ſpare his perſon, and to ſubmit himſelf to fortune and a generous victor, Porus followed his advice; and we may truly ſay, that the condition of this Indian king ſuffered nothing by the loſs of the battle. Alexander immediately gave him his liberty, reſtored him ſhortly after to his kingdom, to which he annexed provinces almoſt equal to it in value. Neither was Alexander a loſer by his munificence; for Porus remained his true friend and conſtant ally.

96
He ſubmits to Alexander.

To perpetuate the memory of this victory, Alexander ordered two cities to be erected; one on the field of battle, which he named *Nicæa;* the other on this ſide the river, which he called *Bucephala*, in honour of his horſe Bucephalus, who died here, as Arrian ſays, of mere old age, being on the verge of 30. All the ſoldiers who fell in the battle, he buried with great honours; offered ſolemn ſacrifices to the gods, and exhibited pompous ſhows on the banks of the Hydaſpes, where he had forced his paſſage. He than entered the territories of the Glauſæ, in which were 37 good cities, and a multitude of populous villages. All theſe were delivered up to him without fighting; and as ſoon as he received them, he preſented them to Porus; and having reconciled him to Taxiles, he ſent the latter home to his own dominions. About this time ambaſſadors arrived from ſome Indian princes with their ſubmiſſions: and Alexander having conquered the dominions of another Porus, which lay on the Hydraotes, a branch of the Indus, added them to thoſe of Porus his ally.

97
Sangala taken.

In the middle of all this ſucceſs, however, news arrived, that the Cathei, the Oxydracæ, and the Malli, the moſt warlike nations of India, were confederated againſt the Macedonians, and had drawn together a great army. The king immediately marched to give them battle; and in a few days reached a city called *Sangala*, ſeated on the top of a hill, and having a fine lake behind it. Before this city the confederate Indians lay encamped, having three circular lines of carriages locked together, and their tents pitched in the centre. Notwithſtanding the apparent difficulty of forcing theſe intrenchments, Alexander reſolved immediately to attack them. The Indians make a noble defence; but at laſt the firſt line of their carriages was broken, and the Macedonians entered. The ſecond was ſtronger by far; yet Alexander attacked that too, and after a deſperate reſiſtance forced it. The Indians, without truſting to the third, retired into the city; which Alexander would have inveſted: but the foot he had with him not being ſufficient for that purpoſe, he cauſed his works to be carried on both ſides as far as the lake; and, on the other ſide of that, ordered ſeveral brigades of horſe to take poſt; ordering alſo battering engines to be brought up, and in ſome places employing miners. The ſecond night, he received intelligence that the beſieged, knowing the lake to be fordable, intended to make their eſcape through it. Upon this the king ordered all the carriages which had been taken in forcing their camp to be placed up and down the roads, in hopes of hindering their flight; giving directions to Ptolemy, who commanded the horſe on the other ſide of the lake, to be extremely vigilant, and to cauſe all his trumpets to ſound, that the forces might repair to that poſt where the Indians made their greateſt effort. Theſe precautions had all the effect that could be deſired: for of the few Indians who got through the lake, and paſſed the Macedonian horſe, the greater part were killed on the roads; but the greateſt part of their army was conſtrained to retire again through the water into the city. Two days after, the place was taken by ſtorm. Seventeen thouſand Indians were killed: 70,000 taken priſoners; with 300 chariots, and 500 horſe. The Macedonians are ſaid to have loſt only 100 men in this ſiege; but they had 1200 wounded, and among theſe ſeveral perſons of great diſtinction.

The city was no ſooner taken, than Alexander deſpatched Eumenes his ſecretary, with a party of horſe, to acquaint the inhabitants of the cities adjacent with what had befallen the Sangalans; promiſing alſo, that they ſhould be kindly treated if they would ſubmit. But they were ſo much affrighted at what had happened to their neighbours, that, abandoning all their cities, they fled into the mountains; chooſing rather to expoſe themſelves to wild beaſts, than to theſe invaders, who had treated their countrymen ſo cruelly. When the king was informed of this, he ſent detachments of horſe and foot to ſcour the roads; and theſe, finding aged, infirm, and wounded people, to the number of about 500, put them to the ſword without mercy. Perceiving that it was impoſſible to perſuade the inhabitants to return, he cauſed the city of Sangala to be razed, and gave the territories to the few Indians who had ſubmitted to him.

98
And razed.

Alexander, ſtill unſated with conqueſt, now prepared to paſs the Hyphaſis. The chief reaſon which induced him to think of this expedition was, the information he had received of the ſtate of the countries beyond that river. He was told that they were in themſelves rich and fruitful; that their inhabitants were not only a very martial people, but very civilized; that they were governed by the nobility, who were themſelves ſubject to the laws; and that as they lived in happineſs and freedom, it was likely they would fight obſtinately in defence of thoſe bleſſings. He was farther told, that among theſe nations there were the largeſt, ſtrongeſt, and moſt uſeful elephants bred and tamed; and was therefore fired with an earneſt deſire to reduce ſuch a bold and brave people under his rule, and of attaining to the poſſeſſion of the many valuable things that were ſaid to be amongſt them. As exorbitant, however, as his perſonal ambition was, he found it impoſſible to infuſe any part of it into the minds of his ſoldiers; who were ſo far from wiſhing to triumph over new and remote countries, that they were highly deſirous of leaving thoſe that they had already conquered. When therefore they were informed of the king's intentions, they privately conſulted together in the camp about the ſituation of their own affairs. At this conſultation, the graveſt and beſt of the ſoldiers lamented that they were made uſe of by their king, not as lions, who fall fiercely upon thoſe who have injured them; but as maſtiffs, who fly upon and tear thoſe who are pointed out to them as enemies. The reſt were not ſo modeſt; but expreſſed themſelves roundly againſt the king's humour, for leading them from battle to battle, from ſiege to ſiege, and from river to river; proteſting that they would follow him no further, nor riſk their lives any longer, to purchaſe fame for him.

99
Alexander's troops refuſe to proceed further.

Alexander was a man of too much penetration not to be early in perceiving that his troops were very uneaſy. He therefore harangued them from his tribunal; but though his eloquence was great, and the love his army had for him was yet very ſtrong, they did not relent. For ſome time the ſoldiers remained ſullen and ſilent; and at laſt turned their eyes on Cœnus, an old and experienced general, whom Alexander loved, and in whom the army put great confidence.—He had the generoſity to undertake their cauſe; and told Alexander frankly, "That men endured toil in hopes of repoſe; that the Macedonians were already much reduced in their numbers; that of thoſe who remained, the greater part were invalids; and that they expected, in conſideration of their former ſervices, that he would now lead them back to their native country: an act which, of all others, would moſt contribute to his own great deſigns; ſince it would encourage the youth of Macedon, and even of all Greece, to follow him in whatever new expedition he pleaſed to undertake." The king was far from being pleaſed with this ſpeech of Cœnus, and much leſs with the diſpoſition of his army, which continued in a deep ſilence. He therefore diſmiſſed the aſſembly: but next day he called another, wherein he told the ſoldiers plainly, that he would not be driven from his purpoſe; that he would proceed in his conqueſts with ſuch as ſhould follow him voluntarily; as for the reſt, he would not detain them, but would leave them at liberty to go home to Macedon, where they might publiſh, "that they had left their king in the midſt of his enemies." Even this expedient had no ſucceſs; his army was ſo thoroughly tired with long marches and deſperate battles, that they were determined to go no further, either for fair ſpeeches or foul. Upon this Alexander retired to his tent, where he refuſed to ſee his friends, and put on the ſame gloomy temper that reigned among his troops. For three days things remained in this ſituation. At laſt the king ſuddenly appeared; and, as if he had been fully determined to purſue his firſt deſign, he gave orders for ſacrificing for the good ſucceſs of his new undertaking. Ariſtander the augur reported, that the omens were altogether inauſpicious; upon which the king ſaid, that ſince his proceeding farther was neither pleaſing to the gods, nor grateful to his army, he would return. When this was rumoured among the army, they aſſembled in great numbers about the royal tent, ſaluting the king with loud acclamations, wiſhing him ſucceſs in all his future deſigns; giving him at the ſame time hearty thanks, for that "he who was invincible had ſuffered himſelf to be overcome by their prayers."

100
He conſents to return.

A ſtop being thus put to the conqueſts of Alexander, he determined to make the Hyphaſis the boundary of his dominions; and having erected twelve altars of an extraordinary magnitude, he ſacrificed on them: after which he exhibited ſhows in the Grecian manner; and, having added all the conquered country in theſe parts to the dominions of Porus, he

[illegible]

began to return. Having arrived at the Hydaſpes, he made the neceſſary preparations for ſailing down the Indus into the ocean. For this purpoſe, he ordered vaſt quantities of timber to be felled in the neighbourhood of the Hydaſpes, through which he was to ſail into the Indus; he cauſed the veſſels with which he had paſſed other rivers to be brought thither, and aſſembled a vaſt number of artificers capable of building and equipping his fleet; which, when finiſhed, conſiſted of 80 veſſels of three banks of oars, and 2000 leſſer ſhips and tranſports. Thoſe who were to manage this fleet were collected out from the Phœnicians, Cyprians, Carians, and Egyptians following his army, and who were reckoned perfectly well ſkilled in the naval art. When all things were ready, the army embarked about break of day: the king, in the mean time, ſacrificing to the gods according to the ceremonies uſed in his own country, and likewiſe according to thoſe of the country where he now was. Then he himſelf went on board; and cauſing the ſignal to be given by ſound of trumpet, the fleet ſet ſail. Craterus and Hephæſtion had marched ſome days before with another diviſion of the army; and in three days the fleet reached that part of the river which was oppoſite to their camps. Here he had information, that the Oxydracæ and Malli were raiſing forces to oppoſe him; upon which he immediately determined to reduce them; for, during this voyage, he made it a rule to compel the inhabitants on both ſides of the river to yield him obedience. But before he arrived on the coaſts of the people above mentioned, he himſelf ſuſtained no ſmall danger; for, coming to the confluence of the Aceſines with the Hydaſpes, from whence both rivers roll together into the Indus, the eddies, whirlpools, and rapid currents, ruſhing with tremendous noiſe from the reſpective channels of thoſe rivers into the great one formed by them both, at once terrified thoſe who navigated his veſſels, and actually deſtroyed many of the long veſſels, with all who were aboard of them; the king himſelf being in ſome danger, and Nearchus the admiral not a little at a loſs. As ſoon as this danger was over, Alexander went on ſhore; and having ordered his elephants with ſome troops of horſe and archers to be carried acroſs, and put under the command of Craterus, he then divided his army on the left hand bank into three bodies; the firſt commanded by himſelf, the ſecond by Hephæſtion, and the third by Ptolemy. Hephæſtion had orders to move ſilently through the heart of the country, five days march before the king; that if, on Alexander's approach, any of the barbarians ſhould attempt to ſhelter themſelves by retiring into the country, they might fall into the hands of Hephæſtion. Ptolemy Lagus was ordered to march three days journey behind the king, that if any eſcaped his army, they might fall into Ptolemy's hands; and the fleet had orders to ſtop at the confluence of this river with the Hydraotes till ſuch time as theſe ſeveral corps ſhould arrive.

102
His expedition againſt the Malli.

Alexander himſelf, at the head of a body of horſe and light armed foot, marched through a deſert country againſt the Malli; and, ſcarce affording any reſt to his ſoldiers, arrived in three days at a city into which the barbarians had put their wives and children, with a good garriſon for their defence. The country people, having no notion that Alexander would march through ſuch a deſert and barren region, were all unarmed, and in the utmoſt confuſion. Many of them therefore were ſlain in the field; the reſt fled into the city, and ſhut the gates. But this only protracted their fate for a ſhort time; for the king, having ordered the city to be inveſted by his cavalry, took it, as well as the caſtle, by ſtorm, and put all he found there to the ſword. He ſent at the ſame time Perdiccas with a conſiderable detachment, to inveſt another city of the Malli at a conſiderable diſtance; but when he came there, he found it abandoned. However, he purſued the inhabitants who had but lately left it, and killed great numbers of them on the road. After this the king took ſeveral other cities, but not without conſiderable reſiſtance; for the Indians ſometimes choſe to burn themſelves in their houſes rather than ſurrender. At laſt he marched to their capital city; and finding that abandoned, he proceeded to the river Hydraotes, where he found 50,000 men encamped on the oppoſite bank, in order to diſpute his paſſage. He did not heſitate, however, to enter the river with a conſiderable party of horſe: and ſo much were the Indians terrified at his preſence, that their whole army retired before him. In a ſhort time they returned and attacked him, being aſhamed to fly before ſuch an inconſiderable number; but in the mean time the reſt of the Macedonian forces came up, and the Indians were obliged to retire to a city which lay behind them, and which Alexander inveſted that very night. The next day he ſtormed the city with ſuch violence, that the inhabitants were compelled to abandon it, and to retire to the caſtle, where they prepared for an obſtinate defence. The king inſtantly gave orders for ſcaling the walls, and the ſoldiers prepared to execute theſe orders as faſt as they could; but the king being impatient caught hold of a ladder and mounted it firſt himſelf, being followed by Leonatus, Peuceſtas, and Abreas, the latter a man of great valour, and who on that account had double pay allowed him. The king having gained the top of the battlements, cleared them quickly of the defendants, killing ſome of them with his ſword, and puſhing others over the walls: but after this was done, he was in more danger than ever; for the Indians galled him with their arrows from the adjacent towers, though they durſt not come near enough to engage him. His own battalion of targeteers mounting in haſte to ſecond him, broke the ladders; which, as ſoon as Alexander perceived, he threw himſelf down into the caſtle, as did alſo Peuceſtas, Leonatus, and Abreas. As ſoon as the king was on the ground, the Indian general ruſhed forward to attack him; but Alexander inſtantly deſpatched him, as well as ſeveral others who followed him. Upon this the reſt retired, and contented themſelves with throwing darts and ſtones at him at a diſtance. Abreas was ſtruck into the head with an arrow, and died on the ſpot; and, ſhortly after, another pierced through the king's breaſtplate into his body. As long as he had ſpirits, he defended himſelf valiantly; but, through a vaſt effuſion of blood, loſing his ſenſes, he fell upon his ſhield. Peuceſtas then covered him with the ſacred ſhield of Pallas on one ſide, as did Leonatus with his own ſhield on the other, though they themſelves were

103
His deſperate valour, and danger.

dreadfully wounded. In the mean time, however, the ſoldiers on the outſide, eager to ſave their king, ſupplied their want of ladders, by driving large iron pins into the walls. By the help of theſe many of them aſcended, and came to the aſſiſtance of Alexander and his companions. The Indians were now ſlaughtered without mercy; but Alexander continued for ſome time in a very dangerous way: however, he at laſt recovered his ſtrength, and ſhowed himſelf again to his army, which filled them with the greateſt joy.

104 Is with difficulty ſaved by his men.

The Malli, being now convinced that nothing but ſubmiſſion could ſave the remainder of them, ſent deputies to Alexander, offering the dominion of their country; as did alſo the Oxydracæ: and the king having ſettled every thing in theſe countries agreeable to his mind, proceeded on his voyage down the river Indus. In this voyage he received the ſubmiſſion of ſome other Indian princes; and perceiving, that at the point of the iſland Pattala, the river divided itſelf into two vaſt branches, he ordered an haven and convenient docks to be made there for his ſhips; and when he had careened his fleet, he ſailed down the right hand branch towards the ocean. In his paſſage he ſuſtained great difficulties by reaſon of his want of pilots, and at the mouth of the river very narrowly miſſed being caſt away: yet all this did not hinder him from purſuing his firſt deſign, though it does not appear that he had any other motive thereto than the vain deſire of boaſting that he had entered the ocean beyond the Indus: for, having conſecrated certain bulls to Neptune, and thrown them into the ſea, performed certain libations of golden cups, and thrown the cups alſo into the ſea, he came back again; having only ſurveyed two little iſlands, one at the mouth of the Indus, and one a little farther in the ocean.

105 He proceeds in his voyage down the Indus.

On the king's return to Pattala, he reſolved to ſail down the other branch of the Indus, that he might ſee whether it was more ſafe and commodious for his fleet than that which he had already tried; and for this he had very good reaſons. He had reſolved to ſend Nearchus with his fleet by ſea, through the Perſian gulf up the river Tigris, to meet him and his army in Meſopotamia; but as the poſſibility of this voyage depended on the ceaſing of the Eteſian winds, there was a neceſſity of laying up the fleet till the ſeaſon ſhould prove favourable. Alexander, therefore, ſailing through this branch of the Indus, ſought on the ſea coaſt for bays and creeks, where his fleet might anchor in ſafety; he cauſed alſo pits to be ſunk, which might be filled with freſh water for the uſe of his people; and took all imaginable precautions for preſerving them in eaſe and ſafety till the ſeaſon would allow them to continue their voyage. In this he ſucceeded to his wiſh; for he found this branch of the river Indus, at its mouth, ſpread over the plain country, and forming a kind of lake, wherein a fleet might ride with ſafety. He therefore appointed Leonatus, and a part of his army, to carry on ſuch works as were neceſſary: cauſing them to be relieved by freſh troops as often as there was occaſion: then having given his laſt inſtructions to Nearchus, he departed with the reſt of the army, in order to march back to Babylon.

106 Sets out for Babylon.

Before the king's departure, many of his friends adviſed him againſt the route which he intended to take. They told him, that nothing could be more raſh or dangerous than this reſolution. They acquainted him, that the country through which he was to travel was a wild uncultivated deſert; that Semiramis, when ſhe led her ſoldiers this way out of India, brought home but 20 of them; and that Cyrus, attempting to do the ſame, returned with only ſeven. But all this was ſo far from deterring Alexander, that it more than ever determined him to purſue no other road. As ſoon, therefore, as he had put things in order, he marched at the head of a ſufficient body of troops to reduce the Oritæ, who had never vouchſafed either to make their ſubmiſſion or to court his friendſhip. Their territories lay on the other ſide of a river called *Arabis*, which Alexander croſſed ſo ſpeedily, that they had no intelligence of his march; whereupon moſt of them quitted their country, and fled into the deſerts. Their capital he found ſo well ſituated, that he reſolved to take it out of their hands, and to cauſe a new and noble city to be founded there, the care of which he committed to Hephæſtion. Then he received the deputies of the Oritæ and Gedroſi; and having aſſured them, that if the people returned to their villages, they ſhould be kindly treated, and having appointed Apollophenes preſident of the Oritæ, and left a conſiderable body of troops under Leonatus to ſecure their obedience, he began his march through Gedroſia. In this march his troops ſuffered incredible hardſhips. The road was very uncertain and troubleſome, on account of its lying through deep and looſe ſands, riſing in many places into hillocks, which forced the ſoldiers to climb, at the ſame time that it ſunk under their feet; there were no towns, villages, nor places of refreſhment, to be met with; ſo that, after exceſſive marches, they were forced to encamp among theſe dry ſands. As to proviſions, they hardly met with any during their whole march. The ſoldiers were therefore obliged to kill their beaſts of carriage; and ſuch as were ſent to bring ſome corn from the ſea ſide, were ſo grievouſly diſtreſſed, that, though it was ſealed with the king's ſignet, they cut open the bags, chooſing rather to die a violent death for diſobedience than periſh by hunger. When the king, however, was informed of this, he freely pardoned the offenders; he was alſo forced to accept the excuſes that were daily made for the loſs of mules, horſes, &c. which were in truth eaten by the ſoldiers, and their carriages broken in pieces to avoid further trouble. As for water, their want of it was a great misfortune; and yet their finding it in plenty was ſometimes a greater: for, as by the firſt they periſhed with thirſt, ſo by the latter they were burſt, thrown into dropſies, and rendered incapable of travel. Frequently they met with no water for the whole day together: ſometimes they were diſappointed of it at night; in which caſe, if they were able, they marched on; ſo that it was common with them to travel 30, 40, 50, or even 60 miles without encamping. Numbers through theſe hardſhips were obliged to lag in the rear; and of theſe many were left behind, and periſhed; for indeed ſcarce any ever joined the army again. Their miſeries, however, they ſuſtained with incredible patience, being encouraged by the example of their king; who, on this occaſion, ſuffered greater hardſhips than the meaneſt ſoldier in his army. While

107 His dangerous march through Gedroſia.

108 He arrives in Caramania.

they arrived at the capital of Gedroſia, where they refreſhed themſelves, and ſtaid ſome time: after which they marched into Caramania; which being a very plentiful country, they there made themſelves ample amends for the hardſhips and fatigues they had ſuſtained. Here they were joined firſt by Craterus with the troops under his command, with a number of elephants: then came Staſanor preſident of the Arians, and Phariſmanes the ſon of Phrataphernes governor of Parthia. They brought with them camels, horſes, and other beaſts of burden, in vaſt numbers; having foreſeen, that the king's march through Gedroſia would be attended with the loſs of the greateſt part, if not of all the cavalry and beaſts belonging to his army.

109 Redreſſes the grievances of his people.

During Alexander's ſtay in Caramania, he redreſſed the injuries of his people, who had been grievouſly oppreſſed by their governors during his abſence. Here alſo he was joined by his admiral Nearchus, who brought him an account that all under his command were in perfect ſafety, and in excellent condition; with which the king was mightily pleaſed, and, after having beſtowed on him ſingular marks of his favour, ſent him back to the navy. Alexander next ſet out for Perſia, where great diſorders had been committed during his abſence. Theſe alſo he redreſſed, and cauſed the governor to be crucified; appointing in his room Peuceſtas, who ſaved his life when he fought ſingly againſt a whole garriſon as above related. The new governor was no ſooner inveſted with his dignity, than he laid aſide the Macedonian garb, and put on that of the Medes; being the only one of Alexander's captains, who, by complying with the manners of the people he governed, gained their affection.

110 Marries other two wives.

111 Pays the debts of the army.

While Alexander viſited the different parts of Perſia, he took a view, among the reſt, of the ruins of Perſepolis, where he is ſaid to have expreſſed great ſorrow for the deſtruction he had formerly occaſioned. From Perſepolis he marched to Suſa, where he gave an extraordinary looſe to pleaſure; reſolving to make himſelf and his followers ſome amends for the difficulties they had hitherto undergone: purpoſing at the ſame time ſo effectually to unite his new conquered with his hereditary ſubjects, that the jealouſies and fears which had hitherto tormented both, ſhould no longer ſubſiſt. With this view he married two wives of the blood royal of Perſia; viz. Barſine, or Statira, the daughter of Darius, and Paryſatis the daughter of Ochus. Drypetis, another daughter of Darius, he gave to Hephæſtion; Amaſtrine, the daughter of Oxyartes the brother of Darius, married Craterus; and to the reſt of his friends, to the number of 80, he gave other women of the greateſt quality. All theſe marriages were celebrated at once, Alexander himſelf beſtowing fortunes upon them; he directed likewiſe to take account of the number of his officers and ſoldiers who had married Aſiatic wives; and though they appeared to be 10,000, yet he gratified each of them according to his rank. He next reſolved to pay the debts of his army, and thereupon iſſued an edict directing every man to regiſter his name and the ſum he owed; with which the ſoldiers complying ſlowly, from an apprehenſion that there was ſome deſign againſt them, Alexander ordered tables heaped with money to be ſet in all quarters of the camp, and cauſed every man's debts to be paid on his bare word, without even making any entry of his name: though the whole ſum came to 20,000 talents. On ſuch as had diſtinguiſhed themſelves in an extraordinary manner, he beſtowed crowns of gold. Peuceſtas had the firſt; Leonatus the ſecond; Nearchus the third; Oneſicritus the fourth; Hephæſtion the fifth; and the reſt of his guards had each of them one. After this he made other diſpoſitions for conciliating, as he ſuppoſed, the differences among all his ſubjects. He reviewed the 30,000 youths, whom at his departure for India he had ordered to be taught Greek and the Macedonian diſcipline; expreſſing high ſatisfaction at the fine appearance they made, which rendered them worthy of the appellation he beſtowed on them, viz. that of *Epigoni*, i. e. ſucceſſors. He promoted alſo, without any diſtinction of nation, all thoſe who had ſerved him faithfully and valiantly in the Indian war. When all theſe regulations were made, he gave the command of his heavy armed troops to Hephæſtion, and ordered him to march directly to the banks of the Tigris, while in the mean time a fleet was equipped for carrying the king and the troops he retained with him down to the ocean.

112 He dies at Babylon.

Thus ended the exploits of Alexander; the greateſt conqueror that ever the world ſaw, at leaſt with reſpect to the rapidity of his conqueſts. In 12 years time he had brought under his ſubjection Egypt, Libya, Aſia Minor, Syria, Phœnicia, Paleſtine, Babylonia, Perſia, with part of India and Tartary. Still, however, he meditated greater things. He had now got a great taſte in maritime affairs; and is ſaid to have meditated a voyage to the coaſts of Arabia and Ethiopia, and thence round the whole continent of Africa to the ſtraits of Gibraltar. But of this there is no great certainty; though that he intended to ſubdue the Carthaginians and Italians, is more than probable. All theſe deſigns, however, were fruſtrated by his death, which happened at Babylon in 323 B. C. He is ſaid to have received ſeveral warnings of his approaching fate, and to have been adviſed to avoid that city; which advice he either deſpiſed or could not follow. He died of a fever after eight days illneſs, without naming any ſucceſſor; having only given his ring to Perdiccas, and left the kingdom, as he ſaid, *to the moſt worthy*.

113 His character.

The character of this great prince has been variouſly repreſented; but moſt hiſtorians ſeem to have looked upon him rather as an illuſtrious madman than one upon whom the epithet of *Great* could be properly beſtowed. From a careful obſervation of his conduct, however, it muſt appear, that he poſſeſſed not only a capacity to plan, but likewiſe to execute, the greateſt enterpriſes that ever entered into the mind of any of the human race. From whatever cauſe the notion originated, it is plain that he imagined himſelf a divine perſon, and born to ſubdue the whole world: and extravagant and impracticable as this ſcheme may appear at preſent, it cannot at all be looked upon in the ſame light in the time of Alexander. The Greeks were in his time the moſt powerful people in the world in reſpect to their ſkill in the military art, and the Perſians were the moſt powerful with reſpect to wealth and numbers. The only other powerful people in the world were the Carthaginians, Gauls, and Italian nations. From a long ſeries of wars which the Carthaginians

ginians carried on in Sicily, it appeared that they were by no means capable of contending with the Greeks, even when they had an immenſe ſuperiority of numbers; much leſs then could they have ſuſtained an attack from the whole power of Greece and Aſia united. The Gauls and Italians were indeed very brave, and of a martial diſpoſition; but they were barbarous, and could not have reſiſted armies well diſciplined and under the command of ſuch a ſkilful leader as Alexander. Even long after this time, it appeared that the Romans themſelves could not have reſiſted the Greeks; ſince Regulus, after having defeated the Carthaginians and reduced them to the utmoſt diſtreſs, was totally unable to reſiſt a Carthaginian army commanded by a Greek general, and guided by Greek diſcipline.

Thus it appears, that the ſcheme of Alexander cannot by any means be accounted that of a madman, or of one who projects great things without judgement or means to execute them. If we conſider from his actions the end which moſt probably he had in view, could his ſcheme have been accompliſhed, we ſhall find it not only the greateſt but the *beſt* that can poſſibly be imagined. He did not conquer to deſtroy, enſlave, or oppreſs; but to civilize and unite the whole world as one nation. No ſooner was a province conquered than he took care of it as if it had been part of his paternal inheritance. He allowed not his ſoldiers to oppreſs and plunder the Perſians, which they were very much inclined to do; on the contrary, by giving into the oriental cuſtoms himſelf, he ſtrove to extinguiſh that inveterate hatred which had ſo long ſubſiſted between the two nations. In the Scythian countries which he ſubdued, he purſued the ſame excellent plan. His courage and military ſkill, in which he never was excelled, were diſplayed, not with a view to rapine or deſultory conqueſt, but to civilize and induce the barbarous inhabitants to employ themſelves in a more proper way of life. "Midſt the hardſhips of a military life (ſays Dr Gillies), obſtinate ſieges, bloody battles, and dear bought victories, he ſtill reſpected the rights of mankind, and practiſed the mild virtues of humanity. The conquered nations enjoyed their ancient laws and privileges; the rigours of deſpotiſm were ſoftened; arts and induſtry encouraged; and the proudeſt Macedonian governors compelled, by the authority and example of Alexander, to obſerve the rules of juſtice towards their meaneſt ſubjects. To bridle the fierce inhabitants of the Scythian plains, he founded cities and eſtabliſhed colonies on the banks of the Iaxartes and Oxus; and thoſe deſtructive campaigns uſually aſcribed to his reſtleſs activity, and blind ambition, appeared to the diſcernment of this extraordinary man not only eſſential to the ſecurity of the conqueſts which he had already made, but neceſſary for the more remote and ſplendid expeditions which he ſtill purpoſed to undertake, and which he performed with ſingular boldneſs and unexampled ſucceſs." In another place, the ſame author gives his character in the following words.

"He was of a low ſtature, and ſomewhat deformed; but the activity and elevation of his mind animated and ennobled his frame. By a life of continual labour, and by an early and habitual practice of the gymnaſtic exerciſes, he had hardened his body againſt the impreſſions of cold and heat, hunger and thirſt, and prepared his robuſt conſtitution for bearing ſuch exertions of ſtrength and activity, as have appeared incredible to the undiſciplined ſoftneſs of modern times. In generoſity and in proweſs, he rivalled the greateſt heroes of antiquity; and in the race of glory, having finally outſtripped all competitors, became ambitious to ſurpaſs himſelf. His ſuperior ſkill in war gave uninterrupted ſucceſs to his arms; and his natural humanity, enlightened by the philoſophy of Greece, taught him to improve his conqueſts to the beſt intereſts of mankind. In his extenſive dominions he built or founded not leſs than 70 cities; the ſituation of which being choſen with conſummate wiſdom, tended to facilitate communication, to promote commerce, and to diffuſe civility through the greateſt nations of the earth. It may be ſuſpected, indeed, that he miſtook the extent of human power, when in the courſe of one reign he undertook to change the face of the world; and that he miſcalculated the ſtubbornneſs of ignorance and the force of habit, when he attempted to enlighten barbariſm, to ſoften ſervitude, and to tranſplant the improvements of Greece into an African and Aſiatic ſoil, where they have never been known to flouriſh. Yet let not the deſigns of Alexander be too haſtily accuſed of extravagance. Whoever ſeriouſly conſiders what he actually performed before his 33d year, will be cautious of determining what he might have accompliſhed had he reached the ordinary term of human life. His reſources were peculiar to himſelf; and ſuch views as well as actions became him as would have become none beſides. In the language of a philoſophical hiſtorian, 'he ſeems to have been given to the world by a peculiar diſpenſation of Providence, being a man like to none other of the human kind.'

"From the part which his father Philip and himſelf acted in the affairs of Greece, his hiſtory has been tranſmitted through the impure channels of exaggerated flattery or malignant envy. The innumerable fictions which diſgrace the works of his biographers, are contradicted by the moſt authentic accounts of his reign, and inconſiſtent with thoſe public tranſactions which concurring authorities confirm. In the preſent work it ſeemed unneceſſary to expatiate on ſuch topics, ſince it is leſs the buſineſs of hiſtory to repeat or even to expoſe errors than to ſelect and impreſs uſeful truths. An author, ambitious of attaining that purpoſe, can ſeldom indulge the language of general panegyric. He will acknowledge, that Alexander's actions were not always blameleſs; but, after the moſt careful examination, he will affirm, that his faults were few in number, and reſulted from his ſituation rather than from his character.

"From the firſt years of his reign he experienced the crimes of diſaffection and treachery, which multiplied and became more dangerous with the extent of his dominions and the difficulty to govern them. Several of his lieutenants early aſpired at independence; others formed conſpiracies againſt the life of their maſter. The firſt criminals were treated with a lenity becoming the generous ſpirit of Alexander: but when Philotas, the ſon of Parmenio, and even Parmenio himſelf, afforded reaſon to ſuſpect their fidelity; when the Macedonian youths, who, according to the [illegible] tution of Philip, guarded the royal pavilion, prepared to murder their ſovereign, he found it neceſſary to depart from his lenient ſyſtem, and to hold with a firmer hand the reins of government. Elated by unexampled proſperity, and the ſubmiſſive reverence of vanquiſhed nations, his loftineſs diſguſted the pride of his European troops, particularly the Macedonian nobles, who had been accuſtomed to regard themſelves rather as his companions than ſubjects. The pretenſions which ſound policy taught him to form and to maintain, of being treated with thoſe external honours ever claimed by the monarchs of the Eaſt, highly offended the religious prejudices of the Greeks, who deemed it impious to proſtrate the body or bend the knee to any mortal ſovereign. Yet had he remitted formalities conſecrated by the practice of ages, he muſt inſenſibly have loſt the reſpect of his Aſiatic ſubjects. With a view to reconcile the diſcordant principles of the victors and vanquiſhed, he affected an immediate deſcent from Jupiter Ammon, a claim liberally admitted by the avarice or fears of the Libyan prieſts; and which, he had reaſon to expect, could not be very obſtinately denied by the credulity of the Greeks and Macedonians; who univerſally acknowledged that Philip, his reputed father, was remotely deſcended from the Grecian Jupiter. But the ſucceſs of this deſign, which might have entitled him, as ſon of Jupiter, to the ſame obeiſance from the Greeks which the barbarians readily paid him as monarch of the Eaſt, was counteracted, at firſt by the ſecret diſpleaſure, and afterwards by the open indignation, of ſeveral of his generals and courtiers. Nor did the conduct of Alexander tend to extricate him from this difficulty. With his friends he maintained that equal intercourſe of viſits and entertainments which characterized the Macedonian manners; indulged the liberal flow of unguarded converſation; and often exceeded that intemperance in wine which diſgraced his age and country."

We ſhall conclude this character of Alexander with obſerving, that he had in view, and undoubtedly muſt have accompliſhed, the ſovereignty of the ocean as well as of the land. The violent reſiſtance made by the Tyrians had ſhown him the ſtrength of a commercial nation; and it was undoubtedly with a view to enrich his dominions by commerce, that he equipped the fleet on the Indus, and wiſhed to keep up a communication with India by ſea as well as by land. "It was chiefly with a view to the former of theſe objects (ſays Dr Robertſon), that he examined the navigation of the Indus with ſo much attention. With the ſame view, on his return to Suſa, he in perſon ſurveyed the courſe of the Euphrates and Tigris, and gave directions to remove the cataracts or dams with which the ancient monarchs of Perſia, induced by a peculiar precept of their religion, which enjoined them to guard with the utmoſt care againſt defiling any of the elements, had conſtructed near the mouths of theſe rivers, in order to ſhut out their ſubjects from any acceſs to the ocean. By opening the navigation in this manner, he propoſed, that the valuable commodities of India ſhould be conveyed from the Perſian gulf into the interior parts of his Aſiatic dominions, while by the Arabian gulf they ſhould be carried to Alexandria, and diſtributed to the reſt of the world.

"Grand and extenſive as theſe ſchemes were, the precautions employed, and the arrangements made for carrying them into execution, were ſo various and ſo proper, that Alexander had good reaſon to entertain ſanguine hopes of their proving ſucceſsful. At the time when the mutinous ſpirit of his ſoldiers obliged him to relinquiſh his operations in India, he was not 30 years of age complete. At this enterpriſing period of life, a prince of a ſpirit ſo active, perſevering, and indefatigable, muſt have ſoon found means to reſume a favourite meaſure on which he had been long intent. If he had invaded India a ſecond time, he would not, as formerly, have been obliged to force his way through hoſtile and unexplored regions, oppoſed at every ſtep by nations and tribes of barbarians whoſe names had never reached Greece. All Aſia, from the ſhores of the Ionian ſea to the banks of the Hyphaſis, would then have been ſubject to his dominion; and through that immenſe ſtretch of country he had eſtabliſhed ſuch a chain of cities or fortified ſtations, that his armies might have continued their march with ſafety, and have found a regular ſucceſſion of magazines provided for their ſubſiſtence. Nor would it have been difficult for him to bring into the field forces ſufficient to have achieved the conqueſt of a country ſo populous and extenſive as India. Having armed and diſciplined his ſubjects in the eaſt like Europeans, they would have been ambitious to imitate and to equal their inſtructors; and Alexander might have drawn recruits, not from his ſcanty domains in Macedonia and Greece, but from the vaſt regions of Aſia, which in every age has covered the earth, and aſtoniſhed mankind with its numerous armies. When at the head of ſuch a formidable power he had reached the confines of India, he might have entered it under circumſtances very different from thoſe in his firſt expedition. He had ſecured a firm footing there, partly by means of the garriſons which he left in the three cities which he had built and fortified, and partly by his alliance with Taxiles and Porus. Theſe two Indian princes, won by Alexander's humanity and beneficence, which, as they were virtues ſeldom diſplayed in the ancient mode of carrying on war, excited of courſe a higher degree of admiration and gratitude, had continued ſteady in their attachment to the Macedonians. Reinforced by their troops, and guided by their information as well as by the experience which he had acquired in his former campaigns, Alexander muſt have made rapid progreſs in a country where every invader from his time to the preſent age has proved ſucceſsful.

"But this and all his other ſplendid ſchemes were terminated at once by his untimely death. In conſequence of that, however, events took place which illuſtrate and confirm the juſtneſs of the preceding ſpeculations and conjectures, by evidence the moſt ſtriking and ſatisfactory. When that great empire, which the ſuperior genius of Alexander had kept united and in ſubjection, no longer felt his ſuperintending controul, it broke into pieces, and its various provinces were ſeized by his principal officers, and parcelled out among them. From ambition, emulation, and perſonal animoſity, they ſoon turned their arms againſt one another; and as ſeveral of the leaders were equally eminent for political abilities and for military ſkill, the conteſt was maintained long, and carried on with frequent viciſſitudes of fortune. Amidſt the various convulſions and revolutions which theſe occaſioned, it was found that the meaſures of Alexander for the preſervation of his conqueſts had been concerted with ſuch ſagacity, that upon the final reſtoration of tranquility, the Macedonian dominion continued to be eſtabliſhed in every part of Aſia, and not one province had ſhaken off the yoke. Even India, the moſt remote of Alexander's conqueſts, quietly ſubmitted to Python the ſon of Agenor, and afterwards to Seleucus, who ſucceſſively obtained dominion over that part of Aſia. Porus and Taxiles, notwithſtanding the death of their benefactor, neither declined ſubmiſſion to the authority of the Macedonians, nor made any attempt to recover independence."

114
Cauſes of the diſſolution of his empire.

With the death of Alexander fell alſo the glory of the Macedonians; who very ſoon relapſed into a ſituation as bad, or worſe, than that in which they had been before the reign of Philip. This was occaſioned principally by his not having diſtinctly named a ſucceſſor, and having no child of his own come to the years of diſcretion to whom the kingdom might ſeem naturally to belong. The ambition and jealouſy of his mother Olympias, his queen Roxana, and eſpecially of the great commanders of his army, not only prevented a ſucceſſor from being ever named, but occaſioned the death of every perſon, whether male or female, who was in the leaſt related to Alexander. To have a juſt notion of the origin of theſe diſturbances, it is neceſſary in the firſt place to underſtand the ſituation of the Macedonian affairs at the time of Alexander's death.

When Alexander ſet out for Aſia, he left Antipater, as we formerly obſerved, in Macedon, to prevent any diſturbances that might ariſe either there or in Greece. The Greeks, even during the lifetime of Alexander, bore the ſuperiority which he exerciſed over them with great impatience; and, though nothing could be more gentle than the government of Antipater, yet he was exceedingly hated, becauſe he obliged them to be quiet. One of the laſt actions of Alexander's life ſet all Greece in a flame. He had, by an edict, directed all the cities of Greece to recal their exiles; which edict, when it was publiſhed at the Olympic games, created much confuſion. Many of the cities were afraid, that, when the exiles returned, they would change the government; moſt of them doubted their own ſafety if the edict took place; and all of them held this peremptory decree to be a total abolition of their liberty. No ſooner therefore did the news of Alexander's death arrive than they prepared for war.

115
ridæus ppointed ng.

In Aſia the ſtate of things was not much better; not indeed through any inclination of the conquered countries to revolt, but through the diſſenſions among the commanders.—In the general council which was called ſoon after the death of Alexander, after much confuſion and altercation, it was at laſt agreed, or rather commanded by the ſoldiers, that Aridæus the brother of Alexander, who had always accompanied the king, and had been wont to ſacrifice with him, ſhould aſſume the ſovereignty.—This Aridæus was a man of very ſlender parts and judgement, not naturally, but by the wicked practices of Olympias, who had given him poiſonous draughts in his infancy, leſt he ſhould ſtand in the way of her ſon Alexander or any of his family; and for this, or ſome other reaſon, Perdiccas, Ptolemy, and moſt of the horſe officers, reſented his promotion to ſuch a degree, that they quitted the aſſembly, and even the city. However, Meleager, at the head of the phalanx, vigorouſly ſupported their firſt reſolution, and threatened loudly to ſhed the blood of thoſe who affected to rule over their equals, and to aſſume a kingdom which noway belonged to them: Aridæus was accordingly arrayed in royal robes, had the arms of Alexander put upon him, and was ſaluted by the name of *Philip*, to render him more popular. Thus were two parties formed, at the head of whom were Meleager and Perdiccas, both of them pretending vaſt concern for the public good, yet, at bottom, deſiring nothing more than their own advantage. Perdiccas was a man of high birth, and had a ſupreme command in the army, was much in favour with Alexander, and one in whom the nobility had put great confidence. Meleager had become formidable by having the phalanx on his ſide, and having the nominal king entirely in his power; for Aridæus, or Philip, was obliged to comply with whatever he thought proper; and publicly declared, that whatever he did was by the advice of Meleager; ſo that he made his miniſter accountable for his own actions, and noway endangered himſelf. The Macedonians alſo, beſides their regard for the deceaſed king, ſoon began to entertain a perſonal love for Philip on account of his moderation.

116
A party formed by Meleager, and another by Perdiccas.

It is remarkable, however, that notwithſtanding all the favours which Alexander had conferred upon his officers, and the fidelity with which they had ſerved him during his life, only two of them were attached to the intereſts of his family after his death. Theſe were Antipater, and Eumenes the Cardian, whom he had appointed his ſecretary. Antipater, as we have already ſeen, was embroiled with the Greeks, and could not aſſiſt the royal family who were in Aſia; and Eumenes had not as yet ſufficient intereſt to form a party in their favour. In a ſhort time, however, Perdiccas prevailed againſt Meleager, and got him murdered; by which means the ſupreme power for a time fell into his hands. His firſt ſtep, in conſequence of this power, was to diſtribute the provinces of the empire among the commanders in the following manner, in order to prevent competitors, and to ſatisfy the ambition of the principal commanders of the army. Aridæus, and the ſon of Roxana, born after the death of his father, were to enjoy the regal authority. Antipater had the government of the European provinces. Craterus had the title of *protector*. Perdiccas was general of the houſehold troops in the room of Hephæſtion. Ptolemy the ſon of Lagus had Egypt, Libya, and that part of Arabia which borders upon Egypt. Cleomenes, a man of infamous character, whom Alexander had made receiver-general in Egypt, was made Ptolemy's deputy. Leomedon had Syria; Philotas, Cilicia; Python, Media; Eumenes, Cappadocia, Paphlagonia, and all the country bordering on the Euxine ſea, as far as Trapezus; but theſe were not yet conquered, ſo that he was a governor without a province. Antigonus had Pamphylia, Lycia, and Phrygia Major; Caſſander, Caria; Menander, Lydia; Leonatus, Phrygia on the Helleſpont.

117
Meleager murdered, and the empire divided.

In the mean time, not only Alexander's will, but Alexander himſelf, was ſo much neglected, that his body was allowed to remain ſeven days before any notice was taken of it, or any orders given for its being embalmed. The only will he left was a ſhort memo-

118
Alexander's body neglected.

randum of ſix things he would have done.—1. The building of a fleet of 1000 ſtout galleys, to be made uſe of againſt the Carthaginians and other nations who ſhould oppoſe the reduction of the ſea-coaſts of Africa and Spain, with all the adjacent iſlands as far as Sicily. 2. A large and regular highway was to be made along the coaſt of Africa, as far as Ceuta and Tangier. 3. Six temples of extraordinary magnificence were to be erected at the expence of 1500 talents each. 4. Caſtles, arſenals, havens, and yards for building ſhips, to be ſettled in proper places throughout his empire. 5. Several new cities were to be built in Europe and Aſia; thoſe in Aſia to be inhabited by colonies from Europe, and thoſe in Europe to be filled with Aſiatics; that, by blending their people and their manners, that hereditary antipathy might be eradicated which had hitherto ſubſiſted between the inhabitants of the different continents. 6. Laſtly, He had projected the building of a pyramid, equal in bulk and beauty to the biggeſt in Egypt, in honour of his father Philip. All theſe deſigns, under pretence of their being expenſive, were referred to a council of Macedonians, to be held nobody knew when or where.

119 The daughters of Darius put to death by Roxana.

The government, being now in the hands of Perdiccas and Roxana, grew quickly very cruel and diſtaſteful. Alexander was ſcarce dead when the queen ſent for Statira and Drypetis the two daughters of Darius, one of whom had been married to Alexander and the other to Hephæſtion: but as ſoon as they arrived at Babylon, cauſed them both to be murdered, that no ſon of Alexander by any other woman, or of Hephæſtion, might give any trouble to her or her ſon Alexander. Siſygambis, the mother of Darius, no ſooner heard that Alexander the Great was dead, than ſhe laid violent hands on herſelf, being apprehenſive of the calamities which were about to enſue.

120 The Greeks revolt, but are ſubdued.

War was firſt declared in Greece againſt Antipater in the year 321 B. C. Through the treachery of the Theſſalians, that general was defeated, with the army he had under his own command. Leonatus was therefore ſent from Aſia, with a very conſiderable army, to his aſſiſtance; but both were overthrown with great loſs by the confederates, and Leonatus himſelf was killed. In a ſhort time, however, Craterus arrived in Greece with a great army, the command of which he reſigned to Antipater. The army of the confederates amounted to 25,000 foot and 3000 horſe; but Antipater commanded no fewer than 40,000 foot, 3000 archers, and 5000 horſe. In ſuch an unequal conteſt, therefore, the Greeks were defeated, and forced to ſue for peace; which they did not obtain but on condition of their receiving Macedonian garriſons into ſeveral of their cities. At Athens alſo the democratic government was abrogated; and ſuch a dreadful puniſhment did this ſeem to the Athenians, that 22,000 of them left their country, and retired into Macedon.

121 Diſturbances in Aſia and Thrace.

While theſe things were doing in Greece, diſturbances began alſo to ariſe in Aſia and in Thrace. The Greek mercenaries, who were diſperſed through the inland provinces of Aſia, deſpairing of ever being allowed to return home by fair means, determined to attempt it by force. For this purpoſe, they aſſembled to the number of 20,000 foot and 3000 horſe; but were all cut off to a man by the Macedonians. In Thrace, Lyſimachus was attacked by one Seuthes, a prince of that country who claimed the dominions of his anceſtors, and had raiſed an army of 20,000 foot and 8000 horſe. But though the Macedonian commander was forced to engage this army with no more than 4000 foot and 2000 horſe, yet he kept the field of battle, and could not be driven out of the country.

122 Ambition and cruelty of Perdiccas.

Perdiccas, in the mean time, by pretending friendſhip to the royal family, had gained over Eumenes entirely to his intereſt; and at laſt put him in poſſeſſion of the province of Cappadocia by the defeat of Ariarathes king of that country, whom he afterwards cruelly cauſed to be crucified. His ambition, however, now began to lead him into difficulties. At the firſt diviſion of the provinces, Perdiccas, to ſtrengthen his own authority, had propoſed to marry Nicæa the daughter of Antipater; and ſo well was this propoſal reliſhed, that her brethren Jollas and Archias conducted her to him, in order to be preſent at the celebration of the nuptials. But Perdiccas now had other things in view. He had been ſolicited by Olympias to marry her daughter Cleopatra, the widow of Alexander king of Epirus, and who then reſided at Sardis in Lydia. Eumenes promoted this match to the utmoſt of his power, becauſe he thought it would be for the intereſt of the royal family; and his perſuaſions had ſuch an effect on Perdiccas, that he was ſent to Sardis to compliment Cleopatra, and to carry preſents to her in name of her new lover. In the abſence of Eumenes, however, Alcetas, the brother of Perdiccas, perſuaded him to marry Nicæa; but, in order to gratify his ambition, he reſolved to divorce her immediately after marriage, and marry Cleopatra. By this laſt marriage, he hoped to have a pretence for altering the government of Macedon: and, as a neceſſary meaſure preparative to theſe, he entered into contrivances for deſtroying Antigonus. Unfortunately for himſelf, however, he ruined all his ſchemes by his own jealouſy and precipitate cruelty. Cynane, the daughter of Philip by his ſecond wife, had brought her daughter named *Adda*, and who was afterwards named *Eurydice*, to court, in hopes that King Aridæus might marry her. Againſt Cynane, Perdiccas, from ſome political motives, conceived ſuch a grudge, that he cauſed her to be murdered. This raiſed a commotion in the army; which frightened Perdiccas to ſuch a degree, that he now promoted the match between Aridæus and Eurydice; to prevent which, he had murdered the mother of the young princeſs. But, in the mean time, Antigonus, knowing the deſigns of Perdiccas againſt himſelf, fled with his ſon Demetrius to Greece, there to take ſhelter under the protection of Antipater and Craterus, whom he informed of the ambition and cruelty of the regent.

123 A combination againſt him

A civil war was now kindled. Antipater, Craterus, Neoptolemus, and Antigonus, were combined againſt Perdiccas; and it was the misfortune of the empire in general, that Eumenes, the moſt able general, as well as the moſt virtuous of all the commanders, was on the ſide of Perdiccas, becauſe he believed him to be in the intereſt of Alexander's family. Ptolemy, in the mean time, remained in quiet poſſeſſion of Egypt; but without the leaſt intention of owning any perſon for his ſuperior: however, he alſo acceded to the league formed againſt Perdiccas; and thus the only perſon in the whole empire who conſulted the intereſt of the royal family was Eumenes.

124 lexander ied in gypt. It was now thought proper to bury the body of Alexander, which had been kept for two years, during all which time preparations had been making for it. Aridæus, to whoſe care it was committed, ſet out from Babylon for Damaſcus, in order to carry the king's body to Egypt. This was ſore againſt the will of Perdiccas; for it ſeems there was a ſuperſtitious report, that wherever the body of Alexander was laid, that country ſhould flouriſh moſt. Perdiccas, therefore, out of regard to his native ſoil, would have it conveyed to the royal ſepulchres in Macedon; but Aridæus, pleading the late king's expreſs direction, was determined to carry it into Egypt, from thence to be conveyed to the temple of Jupiter Ammon.—The funeral was accordingly conducted with all imaginable magnificence. Ptolemy came to meet the body as far as Syria: but, inſtead of burying it in the temple of Jupiter Ammon, erected a ſtately temple for it in the city of Alexandria; and, by the reſpect he ſhowed for his dead maſter, induced many of the Macedonian veterans to join him, and who were afterwards of the greateſt ſervice to him.

125 erdiccas illed by is own en. No ſooner was the funeral over, than both the parties above mentioned fell to blows. Perdiccas marched againſt Ptolemy: but was ſlain by his own men, who, after the death of their general, ſubmitted to his antagoniſt; and thus Eumenes was left alone to contend againſt all the other generals who had ſerved under Alexander. In this conteſt, however, he would by no means have been overmatched, had his ſoldiers been attached to him; but as they had been accuſtomed to ſerve under thoſe very generals againſt whom they were now to fight, they were on all occaſions ready to betray and deſert Eumenes. However, he defeated and killed Neoptolemus and Craterus, but then found himſelf obliged to contend with Antipater and Antigonus. Antipater was now appointed protector of the kings, with ſovereign power; and Eumenes was declared a public enemy. 126 new diſion of the npire. A new diviſion of Alexander's empire took place. Egypt, Libya, and the parts adjacent, were given to Ptolemy, becauſe they could not be taken from him. Syria was confirmed to Leomedon. Philoxenus had Cilicia. Meſopotamia and Arbelitus were given to Amphimachus. Babylon was beſtowed on Seleucus. Suſiana fell to Antigenes, who commanded the Macedonian *Argyraſpidæ* or *Silver Shields*, becauſe he was the firſt who oppoſed Perdiccas. Peuceſtas held Perſia. Tlepolemus had Caramania. Python had Media as far as the Caſpian ſtraits. Staſander had Aria and Drangia; Philip, Parthia; Staſonor, Bactria and Sogdia; Sybirtius, Aracopa; Oxyartes, the father of Roxana, Parapomiſis. Another Python had the country between this province and India. Porus and Taxiles held what Alexander had given them, becauſe they would not part with any of their dominions. Cappadocia was aſſigned to Nicanor. Phrygia Major, Lycaonia, Pamphylia, and Lycia, were given to Antigonus; Caria to Caſſander, Lydia to Clytus, Phrygia the Leſs to Aridæus. Caſſander was appointed general of the horſe; while the command of the houſehold troops was given to Antigonus, with orders to proſecute the war againſt Eumenes. Antipater having thus ſettled every thing as well as he could, returned to Macedon with the two kings, to the great joy of his countrymen, having left his ſon Caſſander to be a check upon Antigonus in Aſia.

Matters now ſeemed to wear a better aſpect than they had yet done; and, had Eumenes believed that his enemies really conſulted the intereſt of Alexander's family, there is not the leaſt doubt that the war would have been immediately terminated. He ſaw, however, that the deſign of Antigonus was only to ſet up for himſelf, and therefore he refuſed to ſubmit. From this time, therefore, the Macedonian empire ceaſed in Aſia: and an account of the tranſactions of this part of the world fall to be recorded under the article SYRIA. The Macedonian affairs are now entirely confined to the kingdom of Macedon itſelf, and to Greece.

127 Total de-[illegible] Alexander's family. Antipater had not long been returned to Macedon, when he died; and the laſt action of his life completed the ruin of Alexander's family. Out of a view to the public good, he had appointed Polyſperchon, the eldeſt of Alexander's captains at hand, to be *protector* and *governor* of Macedon. This failed not to diſguſt his ſon Caſſander; who thought he had a natural right to theſe offices, and of courſe kindled a new civil war in Macedon. This was indeed highly promoted by his firſt actions as a governor. He began with attempting to remove all the governors appointed in Greece by Antipater, and to reſtore democracy wherever it had been aboliſhed. The immediate conſequence of this was, that the people refuſed to obey their magiſtrates; the governors refuſed to reſign their places, and applied for aſſiſtance to Caſſander. Polyſperchon alſo had the imprudence to recal Olympias from Epirus, and allow her a ſhare in the adminiſtration; which Antipater, and even Alexander himſelf, had always refuſed her. The conſequence of all this was, that Caſſander invaded Greece, where he prevailed againſt Polyſperchon: Olympias returned to Macedon, where ſhe cruelly murdered Aridæus and his wife Eurydice; ſhe herſelf was put to death by Caſſander, who afterwards cauſed Roxana and her ſon to be murdered, and Polyſperchon being driven into Etolia, firſt raiſed to the crown Hercules the ſon of Alexander by the daughter of Darius, and then by the inſtigation of Caſſander murdered him, by which means the line of Alexander the Great became totally extinct.

128 Various revolutions in the government. Caſſander having thus deſtroyed all the royal family, aſſumed the regal title, as he had for 16 years before had all the power. He enjoyed the title of *king of Macedon* only three years; after which he died, about 298 B. C. By Theſſalonica, the daughter of Philip king of Macedon, he left three ſons, Philip, Antipater, and Alexander. Philip ſucceeded him, but ſoon after died of a conſumption. A conteſt immediately began between the two brothers, Antipater and Alexander. Antipater ſeized the kingdom; and to ſecure himſelf in it, murdered his mother Theſſalonica, if not with his own hand, at leaſt the execrable act was committed in his preſence. Alexander invited Pyrrhus king of Epirus, and Demetrius the ſon of Antigonus, to aſſiſt him and revenge the death of his mother. But Pyrrhus being bought off, and a peace concluded between the brothers, Alexander, being afraid of having too many protectors, formed a ſcheme of getting Demetrius aſſaſſinated. Inſtead of this, however, both he and Antipater were put to death; and

Demetrius became king of Macedon four years after the death of Caſſander.

In 287 B. C. Demetrius was driven out by Pyrrhus, who was again driven out by Lyſimachus two years after, who was ſoon after killed by Seleucus Nicanor; and Seleucus, in his turn, was murdered by Ptolemy Ceraunus, who became king of Macedon about 280 B. C. The new king was in a ſhort time cut off, with his whole army, by the Gauls; and Antigonus Gonatus, the ſon of Demetrius Poliorcetes, became king of Macedon in 278 B. C. He proved ſucceſsful againſt the Gauls, but was driven out by Pyrrhus king of Epirus; who, however, ſoon diſobliged his ſubjects to ſuch a degree, that Antigonus recovered a great part of his kingdom. But in a little time, Pyrrhus being killed at the ſiege of Argos in Greece, Antigonus was reſtored to the whole of Macedon; but ſcarcely was he ſeated on the throne, when he was driven from it by Alexander the ſon of Pyrrhus. This new invader was, in his turn, expelled by Demetrius the ſon of Antigonus; who, though at that time but a boy, had almoſt made himſelf maſter of Epirus. In this enterpriſe, however, he was diſappointed; but by his means Antigonus was reſtored to his kingdom, which he governed for many years in peace. By a ſtratagem he made himſelf maſter of the city of Corinth, and from that time began to form ſchemes for the thorough conqueſt of Greece. The method he took to accompliſh this was, to ſupport the petty tyrants of Greece againſt the free ſtates: which indeed weakened the power of the latter; but involved the whole country in ſo many calamities, that theſe tranſactions could not redound much to the reputation either of his arms or his honour. About 243 B. C. he died, leaving the kingdom to his ſon, Demetrius II.

129 War with the Romans.

Neither Demetrius, nor his ſucceſſor Antigonus Doſon, performed any thing remarkable. In 221 B. C. the kingdom fell to Philip, the laſt but one of the Macedonian monarchs. To him Hannibal applied for aſſiſtance after the battle of Cannæ, which he refuſed; and the ſame imprudence which made him refuſe this aſſiſtance prompted him to embroil himſelf with the Romans; and at laſt to conclude a treaty with them, by which he in effect became their ſubject, being tied up from making peace or war but according to their pleaſure. In 179 B. C. he was ſucceeded by his eldeſt ſon Perſeus, under whom the war with the Romans was renewed. Even yet the Macedonians were terrible in war; and their phalanx, when properly conducted, ſeems to have been abſolutely invincible by any method of making war known at that time. It conſiſted of 16,000 men, of whom 1000 marched abreaſt, and thus was 16 men deep, each of whom carried a kind of pike 23 feet long. The ſoldiers ſtood ſo cloſe, that the pikes of the fifth rank reached their points beyond the front of the battle. The hindermoſt ranks leaned their pikes on the ſhoulders of thoſe who went before them, and, locking them faſt, preſſed briſkly againſt them when they made the charge; ſo that the firſt five ranks had the impetus of the whole phalanx, which was the reaſon why the ſhock was generally irreſiſtible. The Romans had never encountered ſuch a terrible enemy; and in the firſt battle, which happened 171 B. C. they were defeated with the loſs of 2200 men, while the Macedonians loſt no more than 60. The generals of Perſeus now preſſed him to ſtorm the enemy's camp: but he being naturally of a cowardly diſpoſition, refuſed to comply, and thus the beſt opportunity he ever had was loſt. Still, however, the Romans gained little or no advantage, till the year 168 B. C. when Paulus Æmilius, a moſt experienced commander, was ſent to Macedon. Perſeus now put all upon the iſſue of a general engagement; and Æmilius, with all his courage and military experience, would have been defeated, had the Macedonians been commanded by a general of the ſmalleſt courage or conduct. The light-armed Macedonians charged with ſuch vigour, that after the battle, ſome of their bodies were found within two furlongs of the Roman camp. When the phalanx came to charge, the points of their ſpears ſtriking into the Roman ſhields, kept the heavy-armed troops from making any motion; while, on the other hand, Perſeus's light-armed men did terrible execution. On this occaſion, it is ſaid, that Æmilius tore his clothes, and gave up all hopes. However, perceiving that as the phalanx gained ground it loſt its order in ſeveral places, he cauſed his own light-armed troops to charge in thoſe places, whereby the Macedonians were ſoon put into confuſion. If Perſeus with his horſe had on the firſt appearance of this charged the Romans briſkly, his infantry would have been able to recover themſelves; but inſtead of this, he betook himſelf to flight, and the infantry at laſt did the ſame, but not till 20,000 of them had loſt their lives.

This battle decided the fate of Macedon, which immediately ſubmitted to the conqueror. The cowardly king took refuge in the iſland of Samothrace: but was at laſt obliged to ſurrender to the Roman conſul, by whom he was carried to Rome, led in triumph, and afterwards moſt barbarouſly uſed. Some pretenders to the throne appeared afterwards; but being unable to defend themſelves againſt the Romans, the country was reduced to a Roman province in 148 B. C. To them it continued ſubject till the year 1357, when it was reduced by the Turkiſh ſultan Bajazet, and has remained in the hands of the Turks ever ſince.

130 Macedonia becomes a Roman province.

MACEDONIANS, in eccleſiaſtical hiſtory, the followers of Macedonius, biſhop of Conſtantinople, who through the influence of the Eunomians, was depoſed by the council of Conſtantinople in 360, and ſent into exile. He conſidered the Holy Ghoſt as a divine energy diffuſed throughout the univerſe, and not as a perſon diſtinct from the Father and the Son. The ſect of Macedonians was cruſhed before it had arrived at its full maturity, by the council aſſembled by Theodoſius in 381, at Conſtantinople. See SEMIARIANS.

MACEDONIUS. See MACEDONIANS.

MACER, EMILIUS, an ancient Latin poet, was born at Verona, and flouriſhed under Auguſtus Cæſar. Euſebius relates, that he died a few years after Virgil. Ovid ſpeaks of a poem of his, on the nature and quality of birds, ſerpents, and herbs; which he ſays Macer being then very old had often read to him:

Sæpe ſuas volucres legit mihi grandior ævo,
Quæque nocet ſerpens, quæ juvat herba, Macer.
De Ponto, lib. iv. eleg. 10.

There is extant a poem upon the nature and power of herbs under Macer's name; but it is ſpurious. He alſo wrote a ſupplement to Homer, as Quintus Calaber did afterwards in Greek :

> *Tu canis æterno quicquid reſtabat Homero :*
> *Ne careant ſumma Troica bella manu.*
> *De Ponto*, lib. ii. eleg. 10.

MACERATION, is an infuſion of, or ſoaking ingredients in water or any other fluid, in order either to ſoften them or draw out their virtues.

MACERATA, a handſome and populous town of Italy, in the territory of the church, and in the Marche of Ancona, with a biſhop's ſee, and an univerſity. It is ſeated near the mountain Chiento, in E. Long. 13. 37. N. Lat. 43. 15.

MACHAON, a celebrated phyſician among the ancients, ſon of Æſculapius and brother to Podalirius. He went to the Trojan war with the inhabitants of Trica, Ithome, and Œchalia. According to ſome, he was king of Meſſenia. He was phyſician to the Greeks, and healed the wounds which they received during the Trojan war. Some ſuppoſe he was killed before Troy by Eurypylus the ſon of Telephus. He received divine honours after death, and had a temple in Meſſenia.

MACHÆRUS, in *Ancient Geography*, a citadel on the other ſide Jordan, near the mountains of Moab, not far from and to the north of the *Lacus Aſphaltites*. It was the ſouth boundary of the Peræa : ſituated on a mountain encompaſſed round with deep and broad valleys ; built by Alexander king of the Jews ; deſtroyed by Gabinius, in the war with Ariſtobulus, and rebuilt by Herod, with a cognominal town round it. Here John the Baptiſt was beheaded (Joſephus).

MACHIAN, one of the Molucca iſlands, in the Eaſt Indian ocean, about 20 miles in circumference, and the moſt fertile of them all. It likewiſe produces the beſt cloves ; and is in poſſeſſion of the Dutch, who have three ſtrong forts built on it.

MACHIAVEL, Nicholas, a famous political writer of the 16th century, was born of a diſtinguiſhed family at Florence. He wrote in his native language with great elegance and politeneſs, though he underſtood very little of the Latin tongue ; but he was in the ſervice of Marcellus Virgilius, a learned man, who pointed out to him many of the beautiful paſſages in the ancients, which Machiavel had the art of placing properly in his works. He compoſed a comedy upon the ancient Greek model : in which he turned into ridicule many of the Florentine ladies, and which was ſo well received, that Pope Leo X. cauſed it to be acted at Rome. Machiavel was ſecretary, and afterwards hiſtoriographer, to the republic of Florence. The houſe of Medicis procured him this laſt office, together with a handſome ſalary, in order to pacify his reſentment for having ſuffered the torture upon ſuſpicion of being an accomplice in the conſpiracy of the Soderini againſt that houſe, when Machiavel bore his ſufferings without making any confeſſion. The great encomiums he beſtowed upon Brutus and Caſſius, both in his converſations and writings, made him ſtrongly ſuſpected of being concerned in another conſpiracy againſt Cardinal Julian de Medicis, who was afterwards pope under the name of *Clement VII.* However, they carried on no proceedings againſt him ; but from that time he turned every thing into ridicule, and gave himſelf up to irreligion. He died in 1530, of a remedy which he had taken by way of prevention. Of all his writings, that which has made the moſt noiſe, and has drawn upon him the moſt enemies, is a political treatiſe entitled the *Prince ;* which has been tranſlated into ſeveral languages, and wrote againſt by many authors. The world is not agreed as to the motives of this work ; ſome thinking he meant to recommend tyrannical maxims ; others, that he only delineated them to excite abhorrence. Machiavel alſo wrote, Reflections on Titus Livius, which are extremely curious ; The Hiſtory of Florence, from the year 1205 to 1494 ; and a quarto volume of Poems and other pieces. Mr Harrington conſiders him as a ſuperior genius, and as the moſt excellent writer on politics and government that ever appeared.

MACHINE, *(Machina)*, in the general, ſignifies any thing that ſerves to augment or to regulate moving powers : Or it is any body deſtined to produce motion, ſo as to ſave either time or force. The word comes from the Greek μαχανη, "machine, invention, art :" And hence, in ſtrictneſs, a machine is ſomething that conſiſts more in art and invention, than in the ſtrength and ſolidity of the materials ; for which reaſon it is that inventors of machines are called *ingenieurs* or *engineers*.

Machines are either ſimple or compound. The ſimple ones are the ſeven mechanical powers, viz. lever, balance, pulley, axis and wheel, wedge, ſcrew, and inclined plane. See Mechanics.

From theſe the compound ones are formed by various combinations, and ſerve for different purpoſes. See Mechanics ; alſo Agriculture, Cannon, Centrifugal, Steam, Furnace, Burroughs, Ramsden, &c. &c.

Machines uſed in war amongſt the Greeks were principally theſe ; 1. Κλιμακες, or ſcaling ladders ; 2. The battering ram ; 3. The *helepolis* ; 4. The χελωνη or tortoiſe, called by the Romans *teſtudo* ; 5. The σχωμα or *agger*, which was faced with ſtone, and raiſed higher than the wall : 6. Upon the σχωμα were built πυργοι or towers of wood ; 7. Γεῤῥαι, or oſier hurdles ; 8. *Catapultæ*, or καταπελται, from which they threw arrows with amazing force ; and, 9. The λιθοβολοι, πετροβολοι, or αφετηρια, from which ſtones were caſt with great velocity.

The principal warlike machines made uſe of by the Romans were, the ram, the *lupus* or wolf, the *teſtudo* or tortoiſe, the *baliſta*, the *catapulta*, and the *ſcorpion*.

MACHINERY, in epic and dramatic poetry, is when the poet introduces the uſe of machines ; or brings ſome ſupernatural being upon the ſtage, in order to ſolve ſome difficulty or to perform ſome exploit out of the reach of human power.

The ancient dramatic poets never made uſe of machines, unleſs where there was an abſolute neceſſity for ſo doing ; whence the precept of Horace,

> *Nec Deus interſit, niſi dignus vindice nodus*
> *Inciderit.*

It is quite otherwiſe with epic poets, who introduce machines in every part of their poems ; ſo that nothing is done without the intervention of the gods. In Milton's Paradiſe Loſt, by far the greater part of the actors are ſupernatural perſonages: Homer and Virgil do nothing without them; and, in Voltaire's Henriade, the poet has made excellent uſe of St Louis.

As to the manner in which theſe machines ſhould act, it is ſometimes inviſibly, by ſimple inſpirations and ſuggeſtions; ſometimes by actually appearing under ſome human form; and, laſtly, by means of dreams and oracles, which partake of the other two. However, all theſe ſhould be managed in ſuch a manner as to keep within the bounds of probability.

Plate CCXCVIII.

MACHUL, an inſtrument of muſic among the Hebrews. Kircher apprehends that the name was given to two kinds of inſtruments, one of the ſtringed and the other of the pulſatile kind. That of the former ſort had ſix chords; though there is great reaſon to doubt whether an inſtrument requiring the aid of the hair-bow, and ſo much reſembling the violin, be ſo ancient. The ſecond kind was of a circular form, made of metal, and either hung round with little bells, or furniſhed with iron rings ſuſpended on a rod or bar that paſſed acroſs the circle. Kircher ſuppoſes that it was moved to and fro by a handle fixed to it, and thus emitted a melancholy kind of murmur.

MACHYNLETH, a town of Montgomeryſhire in North Wales, 198 miles from London, and 32 from Montgomery. It is an ancient town; and has a market on Mondays, and fairs on May 16, June 26, July 9, September 18, and November 25, for ſheep, horned cattle, and horſes. It is ſeated on the river Douay, over which there is a large ſtone bridge, which leads into Merionethſhire. It was here that Owen Glyndwr exerciſed the firſt acts of his royalty in 1402. Here he accepted the crown of Wales, and aſſembled a parliament; and the houſe wherein they met is now ſtanding, divided into tenements.

MACKENZIE, Sir George, an able lawyer, a polite ſcholar, and a celebrated wit, was born at Dundee in the county of Angus in Scotland in 1636, and ſtudied at the univerſities of Aberdeen and St Andrew's; after which he applied himſelf to the civil law, travelled into France, and proſecuted his ſtudy in that faculty for about three years. At his return to his native country he became an advocate in the city of Edinburgh; and ſoon gained the character of an eminent pleader. He did not, however, ſuffer his abilities to be confined entirely to that province. He had a good taſte for polite literature; and he gave the public, from time to time, inconteſtable proofs of an uncommon proficiency therein. He had practiſed but a few years, when he was promoted to the office of a judge in the criminal court; and, in 1674, was made king's advocate, and one of the lords of the privy council in Scotland. He was alſo knighted by his majeſty. In theſe ſtations he met with a great deal of trouble, on account of the rebellions which happened in his time; and his office of advocate requiring him to act with ſeverity, he did not eſcape being cenſured, as if in the deaths of ſome particular perſons who were executed he had ſtretched the laws too far. But there does not ſeem to have been any juſt foundation for this clamour againſt him; and it is generally agreed, that he acquitted himſelf like an able and upright magiſtrate. Upon the abrogation of the penal laws by King James II. our advocate, though he had always been remarkable for his loyalty, and even cenſured for his zeal againſt traitors and fanatics, thought himſelf obliged to reſign his poſt; being convinced, that he could not diſcharge the duties of it in that point with a good conſcience. But he was ſoon after reſtored, and held his offices till the Revolution; an event which, it ſeems, he could not bring himſelf to approve. He had hoped that the prince of Orange would have returned to his own country when matters were adjuſted between the king and his ſubjects; and upon its proving otherwiſe, he quitted all his employments in Scotland, and retired into England, reſolving to ſpend the remainder of his days in the univerſity of Oxford. He arrived there in September 1689, and proſecuted his ſtudies in the Bodleian library, being admitted a ſtudent there by a grace paſſed in the congregation, June 2. 1690. In the ſpring following, he went to London; where he fell into a diſorder, of which he died in May 1691. His corpſe was conveyed by land to Scotland, and interred there with great pomp and ſolemnity. "The politeneſs of his learning, and the ſprightlineſs of his wit, were (ſays the reverend Mr Granger) conſpicuous in all his pleadings, and ſhone in his ordinary converſation." Mr Dryden acknowledges, that he was unacquainted with what he calls the *beautiful turn of words and thoughts in poetry*, till they were explained and exemplified to him in a converſation with that noble wit of Scotland Sir George Mackenzie.—He wrote ſeveral pieces of hiſtory and antiquities; Inſtitutions of the laws of Scotland; Eſſays upon various ſubjects, &c. His works were printed together at Edinburgh in 1716, in 2 vols. folio.

MACKEREL. See Scomber, Ichthyology *Index*.

MACLAURIN, Colin, a moſt eminent mathematician and philoſopher, was the ſon of a clergyman, and born at Kilmoddan in Scotland in 1698. He was ſent to the univerſity of Glaſgow in 1709; where he continued five years, and applied himſelf to ſtudy in a moſt intenſe manner. His great genius for mathematical learning diſcovered itſelf ſo early as at twelve years of age; when, having accidentally met with an Euclid in a friend's chamber, he became in a few days maſter of the firſt ſix books without any aſſiſtance: and it is certain, that in his 16th year he had invented many of the propoſitions which were afterwards publiſhed under the title of *Geometria Organica*. In his 15th year he took the degree of maſter of arts; on which occaſion he compoſed and publicly defended a theſis On the power of Gravity, with great applauſe. After this he quitted the univerſity, and retired to a country-ſeat of his uncle, who had the care of his education; for his parents had been dead ſome time. Here he ſpent two or three years in purſuing his favourite ſtudies; but, in 1717, he offered himſelf a candidate for the profeſſorſhip of mathematics in the Mariſchal college of Aberdeen, and obtained it after a ten days trial with a very able competitor. In 1719, he went to London, where he became acquainted with Dr Hoadly then biſhop of Bangor, Dr Clarke, Sir Iſaac Newton, and other eminent men; at which time alſo he was admitted a member of the Royal Society; and in another journey in 1721, he contracted an intimacy with Martin Folkes, Eſq. the preſident of it, which laſted to his death.

In 1722, Lord Polwarth, plenipotentiary of the king of Great Britain at the congreſs of Cambray, engaged him to go as a tutor and companion to his eldeſt ſon, who was then to ſet out on his travels. After a ſhort ſtay at Paris, and viſiting other towns in France, they fixed in Lorrain; where Maclaurin wrote his piece On the Percuſſion of Bodies, which gained the prize of the Royal Academy of Sciences for the year 1724. But his pupil dying ſoon after at Montpelier, he returned immediately to his profeſſion at Aberdeen. He was hardly ſettled here, when he received an invitation to Edinburgh; the curators of that univerſity being deſirous that he ſhould ſupply the place of Mr James Gregory, whoſe great age and infirmities had rendered him incapable of teaching. He had ſome difficulties to encounter, ariſing from competitors, who had good intereſt with the patrons of the univerſity, and alſo from the want of an additional fund for the new profeſſor; which however at length were all ſurmounted, principally by the means of Sir Iſaac Newton. In November 1725, he was introduced into the univerſity. After this, the mathematical claſſes ſoon became very numerous, there being generally upwards of 100 young gentlemen attending his lectures every year; who being of different ſtandings and proficiency, he was obliged to divide them into four or five claſſes, in each of which he employed a full hour every day, from the firſt of November to the firſt of June.

He lived a bachelor to the year 1733: but being not leſs formed for ſociety than for contemplation, he then married Anne, the daughter of Mr Walter Stewart ſolicitor-general to his late majeſty for Scotland. By this lady he had ſeven children, of whom two ſons and three daughters, together with his wife, ſurvived him. In 1734, Berkeley, biſhop of Cloyne, publiſhed a piece called "The Analyſt;" in which he took occaſion, from ſome diſputes that had ariſen concerning the grounds of the fluxionary method, to explode the method itſelf, and alſo to charge mathematicians in general with infidelity in religion. Maclaurin thought himſelf included in this charge, and began an anſwer to Berkeley's book: but, as he proceeded, ſo many diſcoveries, ſo many new theories and problems occurred to him, that inſtead of a vindicatory pamphlet, his work came out, A complete ſyſtem of fluxions, with their application to the moſt conſiderable problems in geometry and natural philoſophy. This work was publiſhed at Edinburgh in 1742, 2 vols. 4to; and as it coſt him infinite pains, ſo it is the moſt conſiderable of all his works, and will do him immortal honour. In the mean time, he was continually obliging the public with ſome performance or obſervation of his own; many of which were publiſhed in the fifth and ſixth volumes of the "Medical Eſſays" at Edinburgh. Some of them were likewiſe publiſhed in the Philoſophical Tranſactions; as the following: 1. Of the conſtruction and meaſure of curves, N° 356. 2. A new method of deſcribing all kinds of curves, N° 359. 3. A letter to Martin Folkes, Eſq. on equations with impoſſible roots, May 1726, N° 394. 4. Continuation of the ſame, March 1729, N° 408. 5. December the 21ſt, 1732, on the deſcription of curves; with an account of farther improvements, and a paper dated at Nancy, November 27, 1722, N° 439. 6. An account of the treatiſe of fluxions, January 27, 1742, N° 467. 7. The ſame continued, March 10. 1742, N° 469. 8. A rule for finding the meridional parts of a ſpheroid with the ſame exactneſs as of a ſphere, Auguſt 1741, N° 461. 9. Of the baſis of the cells wherein the bees depoſite their honey; Nov. 3. 1734, N° 471.

In the midſt of theſe ſtudies, he was always ready to lend his aſſiſtance in contriving and promoting any ſcheme which might contribute to the ſervice of his country. When the earl of Morton ſet out in 1739 for Orkney and Shetland, to viſit his eſtates there, he deſired Mr Maclaurin to aſſiſt him in ſettling the geography of thoſe countries, which is very erroneous in all our maps; to examine their natural hiſtory, to ſurvey the coaſts, and to take the meaſure of a degree of the meridian. Maclaurin's family affairs, and other connections, would not permit him to do this; he drew, however, a memorial of what he thought neceſſary to be obſerved, furniſhed the proper inſtruments, and recommended Mr Short, the famous optician, as a fit operator for the management of them. He had ſtill another ſcheme for the improvement of geography and navigation, of a more extenſive nature; which was the opening a paſſage from Greenland to the South ſea by the north pole. That ſuch a paſſage might be found, he was ſo fully perſuaded, that he has been heard to ſay, if his ſituation could admit of ſuch adventures, he would undertake the voyage, even at his own charge. But when ſchemes for finding it were laid before the parliament in 1744, and himſelf conſulted by ſeveral perſons of high rank concerning them, before he could finiſh the memorials he propoſed to ſend, the premium was limited to the diſcovery of a north-weſt paſſage: and he uſed to regret, that the word weſt was inſerted, becauſe he thought that paſſage, if at all to be found, muſt lie not far from the pole.

In 1745, having been very active in fortifying the city of Edinburgh againſt the rebel army, he was obliged to fly from thence to the north of England; where he was invited by Herring, then archbiſhop of York, to reſide with him during his ſtay in this country. In this expedition, however, being expoſed to cold and hardſhips, and naturally of a weak and tender conſtitution, he laid the foundation of an illneſs which put an end to his life, in June 1746, at the age of 48.

Mr Maclaurin was a very good as well as a very great man, and worthy of love as well as admiration. His peculiar merit as a philoſopher was, that all his ſtudies were accommodated to general utility; and we find, in many places of his works, an application even of the moſt abſtruſe theories, to the perfecting of mechanical arts. He had reſolved, for the ſame purpoſe, to compoſe a courſe of practical mathematics, and to reſcue ſeveral uſeful branches of the ſcience from the bad treatment they often met with in leſs ſkilful hands. But all this his death prevented; unleſs we ſhould reckon, as a part of his intended work, the tranſlation of Dr David Gregory's "Practical Geometry," which he reviſed, and publiſhed with additions, 1745. In his lifetime, however, he had frequent opportunities of ſerving his friends and his country by his great ſkill. Whatever difficulty occurred concerning the conſtructing or perfecting of machines, the working of mines, the improving of manufactures, the conveying of water, or the execution of any other public work, he

Maclaurin.

he was at hand to refolve it. He was likewife employed to terminate fome difputes of confequence that had arifen at Glafgow concerning the gauging of veffels; and for that purpofe prefented to the commiffioners of excife two elaborate memorials, with their demonftrations, containing rules for which the officers now act. He made alfo calculations relating to the provifion, now eftablifhed by law, for the children and widows of the Scots clergy, and of the profeffors in the univerfities, entitling them to certain annuities and fums, upon the voluntary annual payment of a certain fum by the incumbent. In contriving and adjufting this wife and ufeful fcheme, he beftowed a great deal of labour, and contributed not a little towards bringing it to perfection. It may be faid of fuch a man, that "he lived to fome purpofe;" which can hardly be faid of thofe, how uncommon foever their abilities and attainments, who fpend their whole time in abftract fpeculations, and produce nothing to the real ufe and fervice of their fellow creatures.

Of his works, we have mentioned his *Geometria Organica*, in which he treats of the defcription of curve lines by continued motion. We need not repeat what has been faid concerning his piece which gained the prize of the Royal Academy of Sciences in 1724. In 1740, the academy adjudged him a prize, which did him ftill more honour, for folving the motion of the tides from the theory of gravity; a queftion which had been given out the former year, without receiving any folution. He had only ten days to draw this paper up in, and could not find leifure to tranfcribe a fair copy; fo that the Paris edition of it is incorrect. He afterwards revifed the whole, and inferted it in his Treatife of Fluxions; as he did alfo the fubftance of the former piece. Thefe, with the Treatife of Fluxions, and the pieces printed in the Philofophical Tranfactions, of which we have given a lift, are all the writings which our author lived to publifh. Since his death, two volumes more have appeared; his Algebra, and his Account of Sir Ifaac Newton's Philofophical Difcoveries. His Algebra, though not finifhed by himfelf, is yet allowed to be excellent in its kind; containing, in no large volume, a complete elementary treatife of that fcience, as far as it has hitherto been carried. His Account of Sir Ifaac Newton's Philofophy was occafioned in the following manner: Sir Ifaac dying in the beginning of 1728, his nephew, Mr Conduitt, propofed to publifh an account of his life, and defired Mr Maclaurin's affiftance. The latter, out of gratitude to his great benefactor, cheerfully undertook, and foon finifhed, the hiftory of the progrefs which philofophy had made before Sir Ifaac's time, and this was the firft draught of the work in hand; which not going forward, on account of Mr Conduitt's death, was returned to Mr Maclaurin.—To this he afterwards made great additions, and left it in the ftate in which it now appears. His main defign feems to have been, to explain only thofe parts of Sir Ifaac's philofophy which have been, and ftill are, controverted: and this is fuppofed to be the reafon why his grand difcoveries concerning light and colours are but tranfiently and generally touched upon. For it is known, that ever fince the experiments, on which his doctrine of light and colours is founded, have been repeated with due care, this doctrine has not been contefted; whereas his accounting for the celeftial motions, and the other great appearances of nature, from gravity, is mifunderftood, and even ridiculed by fome to this day.

Macquer.

MACQUER, PHILIPPE, advocate of the parliament of Paris, where he was born in 1720, being defcended from a refpectable family. A weaknefs in his lungs having prevented him from engaging in the laborious exercifes of pleading, he dedicated himfelf to literary purfuits. His works are, 1. *L'Abregé Chronologique de l'Hiſtoire Eccleſiaſtique*, 3 vols, 8vo. written in the manner of the prefident Henault's Hiftory of France, but not poffeffed of equal fpirit and elegance. 2. *Les Annales Romaines*, 1756, 8vo; another chronological abridgement, and much better fupported than the former. Into this work the author has introduced every thing moft worthy of notice which has been written by Saint Evremond, Abbé Saint-Real, Prefident Montefquieu, Abbé Mably, &c. concerning the Romans; and, if we except a difference of ftyle, which is eafily difcernible it is, in other refpects, a very judicious compilation. 3. *Abregé Chronologique de l'Hiſtoire d'Eſpagne et de Portugal*, 1759, 1765, in 2 vols, 8vo. This book, in point of accuracy, is worthy of the prefident Henault, by whom it was begun; but it difplays no difcrimination of character nor depth of refearch. The author received affiftance from M. Lacombe, whofe talents for chronological abridgement are well known. The republic of letters fuftained a lofs by the death of M. Macquer, which happened on the 27th of January 1770, at the age of 50. As to his character, he was induftrious, agreeable, modeft, and fincere, and an enemy to all foolifh vanity and affectation. He had a cold imagination, but a correct tafte. He had an eager thirft for knowledge of every kind, and he had neglected no ufeful branch of ftudy. He had a fhare in the Dictionary of Arts and Profeffions, in 2 vols 8vo, and in the Tranflation of the Syphilis of Fracaftor publifhed by Lacombe.

MACQUER, *Pierre Joſeph*, brother to the former, was born at Paris the 9th of October 1718, and died there February 16. 1784. He was a member of the Academy of Sciences, and late profeffor of pharmacy; and was engaged in the *Journal des Sçavans*, for the articles of medicine and chemiftry. With the latter fcience he was intimately acquainted. He had a fhare in the *Pharmacopœia Pariſienſis*, publifhed in 1758, in 4to. His other works are, 1. *Elemens de Chimie théorique*; Paris, 1749, 1753, 12mo; which have been tranflated into Englifh and German.—2. *Elemens de Chimie pratique*, 1751, 2 vols 12mo. Thefe two works were republifhed together, in 1756, in 3 vols. 12mo. 3. *Plan d'un cours de Chimie experimentale et raiſonée*, 1757, 12mo; in the compofition of which he was affociated with M. Beaumé. 4. *Formulæ Medicamentorum Magiſtralium*, 1763. 5. *L'Art de la Teinture en Soie*, 1763. 6. *Dictionnaire de Chimie, contenant la Théorie et la Pratique de cet art*, 1766, 2 vols. 8vo; which has been tranflated into German, with notes; and into Englifh, with notes, by Mr Keir. Macquer has, by his labours and writings, greatly contributed to render ufeful an art which formerly tended only to ruin the health of the patient by foreign remedies, or to reduce the profeſſors of it to beggary, while they proſecuted the idle dreams of converting every thing into gold.

MACRIN, Salmon, one of the beſt Latin poets of the 16th century, was born at Loudun. His true name was *John Salmon*; but he took that of *Macrin*, from his being frequently ſo called in ridicule by Francis I. on account of his extraordinary leanneſs. He was preceptor to Claudius of Savoy, count of Tende; and to Honorius the count's brother; and wrote ſeveral pieces of poetry in lyric verſe, which were ſo admired, that he was called *the Horace of his time*. He died of old age, at Loudun, in 1555.—*Charles Macrin*, his ſon, was not inferior to him as a poet, and ſurpaſſed him in his knowledge of the Greek tongue. He was preceptor to Catharine of Navarre, the ſiſter of Henry the Great; and periſhed in the maſſacre on St Bartholomew's day in 1572.

MACROBII, a people of Ethiopia, celebrated for their juſtice, and the innocence of their manners: alſo a people in the iſland Meroe. The Hyperboreans were alſo called *Macrobii*: They generally lived to their 120th year: and from their longevity they obtained their name (μακρος βιος, *long life*.)

MACROBIUS, Ambrosius Aurelius Theodosius, an ancient Latin writer, who flouriſhed towards the latter part of the fourth century.—Of what country he was, is not clear: Eraſmus, in his Ciceronianus, ſeems to think he was a Greek: and he himſelf tells us, in the preface to his Saturnalia, that he was not a Roman, but laboured under the inconveniences of writing in a language which was not natural to him. Of what religion he was, Chriſtian or Pagan, is uncertain. Barthius ranks him among the Chriſtians; but Spanheim and Fabricius ſuppoſe him to have been a heathen. This, however, is certain, that he was a man of conſular dignity, and one of the chamberlains or maſters of the wardrobe to Theodoſius; as appears from a reſcript directed to Florentius, concerning thoſe who were to obtain that office. He wrote a Commentary upon Cicero's *Somnium Scipionis*, and ſeven books of *Saturnalia*, which treat of various ſubjects, and are an agreeable mixture of criticiſm and antiquity. He was not an original writer, but made great uſe of other people's works, borrowing not only their materials, but even their language, and for this he has been ſatirically rallied by ſome modern authors, though rather unfairly, conſidering the expreſs declaration and apology which he makes on this head, at the very entrance of his work. "Don't blame me," ſays he, "if what I have collected from multifarious reading, I ſhall frequently expreſs in the very words of the authors from whom I have taken it: for my view in this preſent work is, not to give proofs of my eloquence, but to collect and digeſt into ſome regularity and order ſuch things as I thought might be uſeful to be known. I ſhall therefore here imitate the bees, who ſuck the beſt juices from all ſorts of flowers, and afterwards work them up into various forms and orders with ſome mixture of their own proper ſpirit." The *Somnium Scipionis* and *Saturnalia* have been often printed; to which has been added, in the later editions, a piece entitled *De Differentiis et Societatibus Græci Latinique Verbi*.

MACROCEPHALUS (compounded of μακρος "great," and κεφαλη "head,") denotes a perſon with a head larger or longer than the common ſize. Macrocephali, or Long-heads, is a name given to a certain people, who, according to the accounts of authors, were famous for the unſeemly length of their heads: yet cuſtom ſo far habituated them to it, that inſtead of looking on it as a deformity, they eſteemed it a beauty, and, as ſoon as the child was born, moulded and faſhioned its head in their hands to as great a length as poſſible, and afterwards uſed all ſuch rollers and bandages as might ſeem moſt likely to determine its growing long. The greater part of the iſlanders in the Archipelago, ſome of the people of Aſia, and even ſome of thoſe of Europe, ſtill preſs their children's heads out lengthwiſe. We may obſerve alſo, that the Epirots, many people of America, &c. are all born with ſome ſingularity in the conformation of their heads; either a flatneſs on the top, two extraordinary protuberances behind, or one on each ſide: [illegible] which we can only regard as an effect of an ancient and ſtrange mode, which at length is become hereditary in the nation. According to the report of many travellers, the operation of compreſſing the head of a child lengthwiſe, while it is yet ſoft, is with a view inſenſibly to enlarge the interval between the two eyes, ſo that the viſual rays turning more to the right and left, the ſight would embrace a much larger portion of the horizon; the advantage of which they are well acquainted with, either in the conſtant exerciſe of hunting, or on a thouſand other occaſions. Ever ſince the 16th century, the miſſionaries eſtabliſhed in the countries inhabited by the ſavages of America, have endeavoured to deſtroy this cuſtom; and we find in the ſeſſions of the third council of Lima, held in 1585, a canon which expreſsly prohibits it. But if it has been repreſſed one way, the free negroes and Maroons, although Africans, have adopted it, ſince they have been eſtabliſhed among the Caribs, ſolely with the view of diſtinguiſhing their children, which are born free, from thoſe who are born in ſlavery. The Omaquas, a people of South America, according to P. Veigh, preſs the heads of their children ſo violently between two planks that they become quite [illegible] the top, and flat before and behind. They ſay they do this to give their heads a greater reſemblance to the moon.

MACROCERCI, a name given to that claſs of animalcules, which have tails longer than their bodies.

MACROCOLUM, or Macrocollum (formed of μακρος "large," and κολλαω "I join,") among the Romans, the largeſt kind of paper then in uſe. It meaſured ſixteen inches, and frequently two feet.

MACROCOSM, a word denoting the great world or univerſe. It is compounded of the Greek words μακρος "great," and κοσμος "world."

MACROOMP, or Macroom, a town of Ireland, in the barony of Muſkerry, county of Cork, and province of Munſter, 142 miles from Dublin; it is ſituated amongſt hills, in a dry gravelly limeſtone ſoil.—This place is ſaid to take its name from an old crooked oak, ſo called in Iriſh, which formerly grew here. The caſtle was firſt built in King John's time, ſoon after the Engliſh conqueſt (according to Sir Richard Cox), by the Carews; but others attribute it to the Daltons. It was repaired and beautified by Teague Macarty, who died in the year 1565, and was father to the celebrated Sir Cormac Mac Teague mentioned by Camden and other writers as an active perſon in Queen Elizabeth's time. The late earls of Glancarty altered this caſtle into a more modern ſtructure, it being burnt down in the wars of 1641. Oppoſite to the bridge, is the pariſh-church, dedicated to St Colman of Cloyne. Here is a barrack for a foot company, a market-houſe, and handſome Roman Catholic chapel. A conſiderable number of perſons have been employed in this town in combing wool and ſpinning yarn, and ſome ſalt works have been erected here. At half a mile's diſtance is a ſpa, that riſes on the very brink of a bog; its waters are a mild chalybeate, and are accounted ſerviceable in hypochondriacal caſes, and in cutaneous eruptions. The fairs are four in the year.

MACROURUS, a genus of fiſhes belonging to the order *Thoracici*. See ICHTHYOLOGY *Index*.

MACTATIO, in the Roman ſacrifices, ſignifies the act of killing the victim. This was performed either by the prieſt himſelf, or ſome of his inferior officers, whom we meet with under the names of *popæ*, *agones*, *cultrarii*, and *victimarii*; but, before the beaſt was killed, the prieſt, turning himſelf to the eaſt, drew a crooked line with his knife, from the forehead to the tail. Among the Greeks, this ceremony was performed moſt commonly by the prieſt, or, in his abſence, by the moſt honourable perſon preſent. If the ſacrifice was offered to the celeſtial gods, the victim's throat was bent up towards heaven; if to the infernal, or to heroes, it was killed with its throat towards the ground. The manner of killing the animal was by a ſtroke on the head, and, after it was fallen, thruſting a knife into its throat. Much notice was taken, and good or ill ſucceſs predicted, from the ſtruggles of the beaſt, or its quiet ſubmiſſion to the blow, from the flowing of the blood, and the length of time it happened to live after the fall, &c.

MACULÆ, in *Aſtronomy*, dark ſpots appearing on the luminous ſurfaces of the ſun and moon, and even ſome of the planets. See ASTRONOMY *Index*.

MAD-APPLE. See SOLANUM, BOTANY *Index*.

MADAGASCAR, the largeſt of the African iſlands, is ſituated between 43° and 51° of E. Long. and between 12° and 26° of S. Lat.; extending in length near 1000 miles from north-north-eaſt to ſouth-ſouth-weſt, and about 300 in breadth where broadeſt. It was diſcovered in 1506 by Laurence Almeyda; but the Perſians and the Arabians were acquainted with it from time immemorial under the name of *Serandib*. Alphonzo Albuquerque ordered Ruy Pereira dy Conthinto to viſit the interior parts, and that general intruſted Triſtan d'Acunha with the ſurvéy. The Portugueſe called it the iſland of *St Lawrence*; the French who viſited it in the reign of Henry IV. named it *Iſle Dauphine*; its proper name is *Madegaſſe*. It is now, however, by common conſent, called *Madagaſcar*.

This large iſland, according to many learned geographers, is the Cerné of Pliny, and the Menuthiaſde of Ptolemy. It is everywhere watered by large rivers, ſtreams and rivulets, which have their ſources at the foot of that long chain of mountains which runs through the whole extent of the iſland from eaſt to weſt. The two higheſt promontories are called *Vivagora and Botiſmeno*.

These mountains (according to the abbé Rochon*) encloſe within their boſoms a variety of precious minerals and uſeful foſſils. The traveller (who for the firſt time rambles over ſavage and mountainous countries, interſected with valleys and with hills, where nature left to herſelf brings forth the moſt ſingular and the moſt varied productions) is involuntarily ſurpriſed and terrified at the ſight of precipices, the ſummits of which are crowned with monſtrous trees, that ſeem coeval with the world. His aſtoniſhment is redoubled at the noiſe of theſe grand caſcades, the approach to which is generally inacceſſible. But to thoſe views ſo ſublimely pictureſque, rural ſcenes ſoon ſucceed; little hills, gently riſing grounds, and plains, the vegetation of which is never repreſſed by the intemperance or the viciſſitude of the ſeaſons. The eye contemplates with pleaſure thoſe vaſt ſavannas which nouriſh numberleſs herds of bullocks and of ſheep. You behold a flouriſhing agriculture, produced almoſt ſolely by the fertilizing womb of nature. The fortunate inhabitants of Madagaſcar do not bedew the earth with their ſweat; they ſcarcely ſtir the ground with a rake, and even that ſlight preparation is ſufficient. They ſcrape little holes at a ſmall diſtance from each other, into which they ſcatter a few grains of rice, and cover them with their feet; and ſo great is the fertility of the ſoil, that the lands ſown in this careleſs manner produce a hundred fold.

The foreſts preſent a prodigious variety of the moſt uſeful and the moſt beautiful trees; ebony, wood for dying, bamboos of an enormous thickneſs, and palm trees of every kind. The timber employed in ſhip-building is no leſs common than thoſe kinds ſo much prized by the cabinetmaker. We are told by the French governor Flacourt, in his hiſtory of this iſland†, that in the year 1650 he ſent to France 52,000 weight of aloes of an excellent quality. All of theſe various trees and ſhrubs are ſurrounded by an infinite number of paraſitical plants; muſhrooms of an infinite diverſity of kinds and colours are to be met with everywhere in the woods; and the inhabitants know well how to diſtinguiſh thoſe which are prejudicial to the health. They collect large quantities of uſeful gums and reſins; and out of the milky ſap of a tree, denominated by them *finguiore*, the inhabitants, by means of coagulation, make that ſingular ſubſtance known to naturaliſts by the name of *gum elaſtic*. (See CAOUTCHOUC and JATROPHA.)

Beſides the aromatic and medicinal herbs which abound in the foreſts, the iſland produces flax and hemp of a length and ſtrength which ſurpaſs any in Europe. Sugar-canes, wax, honey of different kinds, tobacco, indigo, white pepper, gum-lac, ambergris, ſilk, and cotton, would long ſince have been objects of commerce which Madagaſcar would have yielded in profuſion, if the Europeans, in viſiting the iſland, had furniſhed the inhabitants with the neceſſary information for preparing and improving theſe ſeveral productions.

The ſugar-canes (as we are informed by another traveller‡) are much larger and finer than any in the Weſt Indies; being as thick as a man's wriſt, and ſo full of juice, that a foot of them will weigh two pounds. When the natives travel, they carry a ſugar-cane along with them, which will ſupport them for two or three days. Here are alſo plenty of tamarinds; and ſuch quantities of limes and oranges, that very large caſks may be filled with their juices at a trifling expence, as they may be purchaſed for iron pots, muſkets, powder, ball, &c. During the ſhort time that Admiral Watſon's ſquadron ſtaid here in 1754, Mr Ives preſerved about half a hogſhead full of thoſe juices, which proved afterwards of the greateſt ſervice to the ſhips crews. It muſt be obſerved, however, that no good water is to be had at St Auguſtine in the ſouth-weſt part of the iſland, where ſhips uſually touch, unleſs boats are ſent for it four or five miles up the river; and inſtead of filling their caſks at low water (as is the caſe in moſt other rivers), they muſt begin to fill at about a quarter's flood: The reaſon aſſigned for this is, that the river has a communication with the ſea at other places beſides this of St Auguſtine's bay; and it has been found by experience, that the ſea water brought into the river by the flood tide is not diſcharged till a quarter's flood of the next tide in St Auguſtine's bay; and for three miles up the river, the water is always very brackiſh, if not quite ſalt.

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* [illegible]

† Hiſt. de la Grand Iſle de Madag. Paris 1660.

‡ Ives's Voyage to India, p. 14

The abundance and variety of proviſions of every kind, which a fine climate and fertile ſoil can produce, are on no part of the globe, according to M. Rochon, ſuperior to thoſe of Madagaſcar: game, wild fowl, poultry, fiſh, cattle, and fruits, are alike plentiful. The oxen, Mr Ives alſo informs us, are large and fat, and have each a protuberance of fat between the ſhoulders, weighing about 20 pounds. Their fleſh is greatly eſteemed by all the European nations trading to India, and ſhips are ſent to Madagaſcar on purpoſe to kill and ſalt them on the iſland. The protuberance of fat above mentioned is particularly eſteemed after it has lain ſome time in ſalt; but our author ſays, that he could not join in the encomiums either on this piece or the beef in general; as the herbage on which the creatures feed gives their fleſh a particular taſte, which to him was diſagreeable. The ſheep differ little from the goats; being equally hairy, only that their heads are ſomewhat larger: their necks reſemble that of a calf, and their tails weigh at leaſt ten pounds. Vaſt quantities of locuſts riſe here from the low lands in thick clouds, extending ſometimes to an incredible length and breadth. The natives eat theſe inſects, and even prefer them to their fineſt fiſh. Their method of dreſſing them is to ſtrip off their legs and wings, and fry them in oil.

The inhabitants (termed *Melagaches* or *Madecaſſes*), M. Rochon informs us, are in perſon above the middle ſize of Europeans. The colour of the ſkin is different in different tribes: among ſome it is of a deep black, among others tawny; ſome of the natives are of a copper colour, but the complexion of by far the greateſt number is olive. All thoſe who are black have woolly hair like the negroes of the coaſt of Africa: thoſe, on the other hand, who reſemble Indians and Mulattoes, have hair equally ſtraight with that of the Europeans; the noſe is not broad and flat; the forehead is large and open; in ſhort, all the features are regular and agreeable. Their phyſiognomy diſplays the appearance of frankneſs and of ſatisfaction; they are deſirous only of learning ſuch things as may adminiſter to their neceſſities; the ſpecies of knowledge which demands reflection is indifferent to them: ſober, and inactive, they ſpend the greateſt part of their time either in ſleep or in amuſement. In fine, according to the Abbé, the native of Madagaſcar, like ſavages in general, poſſeſſes a character equally devoid of vice and of virtue; the gratifications of the preſent moment ſolely occupy his attention; he poſſeſſes no kind of foreſight whatever; and he cannot conceive the idea that there are men in the world who trouble themſelves about the evils of futurity.

The population of the iſland has been eſtimated at four millions; but this calculation is thought exaggerated by our author, and indeed it appears incredible to us. Every tribe or ſociety inhabits its own canton, and is governed by its own cuſtoms. Each of theſe acknowledges a chief; this chief is ſometimes elective, but more uſually hereditary. The lands are not divided and portioned out, but belong to thoſe who are at the trouble of cultivating them. Theſe iſlanders make uſe of neither locks nor keys; the principal part of their food conſiſts in rice, fiſh, and fleſh; their rice is moiſtened with a ſoup which is ſeaſoned with pimento, ginger, ſaffron, and aromatic herbs. They diſplay wonderful cunning in catching a variety of birds, many of which are unknown in Europe; they have the pheaſant, the partridge, the quail, the pintado, the wild duck, teal of five or ſix different kinds, the blue hen, the black paroquet, and the turtle-dove, in great plenty; and alſo a bat of a monſtrous ſize, which is much prized on account of its exquiſite flavour. Theſe laſt are ſo hideous in their appearance, that they at firſt terrify the European ſailors: but after they have vanquiſhed their repugnance to them, they prize their fleſh infinitely before that of the pullets of their own country. The Melagaches alſo catch an immenſe quantity of ſea-fiſh: ſuch as the dorado, the ſole, the herring, the mackarel, the turtle, &c. with oyſters, crabs, &c. The rivers afford excellent eels, and mullets of an exquiſite flavour.

The inhabitants near St Auguſtine's bay, Mr Ives informs us, ſpeak as much broken Engliſh as enables them to exchange their proviſions for European articles. Theſe, on the part of the Melagaches are cattle, poultry, milk, fruit, rice, ſalt, porcelain, potatoes, yams, fiſh, lances, and ſhells. From the Europeans they receive muſkets, powder, bullets, flints, *clouties*, (including handkerchiefs, and linen of all kinds), beads, iron pots, &c.—Silver, which they call *manila*, is in great eſteem with them, and is made by them into bracelets for their wives.

That part of the iſland at which the Engliſh ſquadron touched, is the dominions of the king of *Baba*, who, by the account of Mr Ives, ſeemed greatly to affect to be an Engliſhman. They had no ſooner touched at the iſland, than they were waited on by one called *Robin Hood*, and another perſon, both of whom bore the office of *purſers*. Along with theſe were *Philibey* the general; John Anderſon and Frederic Martin, captains. Nor did the king himſelf and his family diſdain to pay them a viſit; who, in like manner were diſtinguiſhed by Engliſh names; the king's eldeſt ſon being called the prince of Wales, and the court not being without a duke of Cumberland, a prince Auguſtus, princeſſes, &c. as in England. All their perſons were on board naked, excepting only a ſlight covering about their loins and on their ſhoulders, made of a kind of graſs growing on the iſland; which they had ornamented with ſmall gold beads by way of [illegible]. Their hair reſembled that of the

Indians in being long and black, rather than the woolly heads of the African negroes. "The wives of the Madagaſcarites (according to our author) take great pains with their huſbands hair; ſometimes putting it in large and regular curls; at other times braiding it in great order, and making it ſhine with a particular oil which the iſland produces. The men always carry in their hands a wooden lance headed with iron, which is commonly made very neat; and they are ſuch excellent markſmen, that they will ſtrike with it a very ſmall object at 30 or 40 yards diſtance. They have alſo commonly a muſket, which they get from Europeans in exchange for cattle, and are always ſure to keep in excellent order. I am ſorry to ſay (continues Mr Ives) that the Engliſh are frequently guilty of great impoſitions in this kind of traffic, by diſpoſing of cheap and ill-tempered barrels among the poor inhabitants, who ſometimes loſe their lives by the burſting of theſe pieces. Such iniquitous practices as theſe muſt in the end prove injurious to the nation; and has indeed already made the name of more than one half of theſe traders truly infamous among the deluded but hitherto friendly Madagaſcarians.

"They are a civil and good-natured people, but eaſily provoked, and apt to ſhow their reſentment on the leaſt provocation, eſpecially when they think themſelves injured or ſlighted. Another characteriſtic of them is, the very high notions of dignity they entertain of their king; which is carried to ſuch a height, that they are never more ſenſibly hurt than when they imagine he is treated with incivility or diſreſpect. This mighty monarch reſides in a town built with mud, about 12 miles up the country from St Auguſtine's bay. On the eaſt ſide of the bay, as you enter, there reſided one Prince William, a relation and tributary to the king; but who in moſt caſes acted as an independent prince, and always uſed his utmoſt endeavours with the officers to cauſe them buy their proviſions from him, and not from the king or his ſubjects. In this prince's territories, not far from the ſea, are the remains of a fort built by Avery the pirate.

"All the women of Madagaſcar, excepting the very pooreſt ſort, wear a covering over their breaſts and ſhoulders, ornamented with glaſs beads, and none go without a cloth about their loins. They commonly walk with a long ſlender rod or ſtick. The men are allowed to marry as many women as they can ſupport.

"During our ſtay at this iſland (ſays Mr Ives), I obſerved with great concern, ſeveral miſerable objects in the laſt ſtage of the venereal diſeaſe. They had not been able to find any cure; and as far as I could learn, their doctors are totally ignorant of medicine. The only method they uſe for curing all diſtempers, as well external as internal, is the wearing on the arm or neck a particular charm or amulet; or beſmearing the part affected with earth moiſtened with the juice of ſome plant or tree, and made up into ſoft paſte.

"I took ſome pains to learn their religious tenets; and find that they worſhip one Univerſal Father; whom, when they ſpeak in Engliſh, they call *God;* and in whom they conceive all kinds of perfection to reſide. The ſun they look upon as a glorious body; and, I believe, as a ſpiritual being, but created and dependent. They frequently look up to it with wonder, if not with praiſe and adoration. They make their ſupplications to the *One* Almighty, and offer ſacrifices to him in their diſtreſſes. I had the curioſity to attend a ſacrifice, at the hut of John Anderſon, whoſe father had for a long time been afflicted with ſickneſs. About ſunſet an ox was brought into the yard; and the ſon, who officiated as prieſt, ſlew it. An altar was reared nigh, and the poſt of it was ſprinkled with the blood of the victim. The head after its being ſevered from the body, was placed, with the horns on, at the foot of the altar: the caul was burned on the fire, and moſt of the pluck and entrails boiled in a pot. The ſick man, who was brought to the door, and placed on the ground ſo as to face the ſacrifice, prayed often, and ſeemingly with great fervency. His eyes were fixed attentively towards the heavens, and his hands held up in a ſupplicating poſture. The ceremony ended with the ſon's cutting up the ox into ſmall pieces; the greateſt part of which he diſtributed among the poor ſlaves belonging to his father and himſelf; reſerving, however, ſome of the beſt pieces for his own uſe. Upon the whole, I ſaw ſo many circumſtances in this Madagaſcarian ſacrifice, ſo exactly reſembling thoſe deſcribed in the Old Teſtament as offered up by the Jews, that I could not turn my thoughts back to the original, without being ſenſibly ſtruck by the exactneſs of the copy."

When the ſquadron firſt arrived at Madagaſcar, the king of Baba, a man of about 60 years of age, was ill of the gout. Having demanded of Admiral Watſon ſome preſents, the latter complimented him, among other things, with ſome brandy. The monarch then aſked him if he had any doctor with him, and if he was a great doctor, and a king's doctor? To all which being anſwered in the affirmative, he deſired him to bring ſome *mahomets* (medicines) for his ſick knee. With this requiſition Mr Ives deſigned to comply; but having waited until ſome officers ſhould be ready to accompany him, his majeſty, in the mean time, took ſuch a doſe of brandy as quickly ſent the gout into his head, and occaſioned his death. Mr Ives obſerves, that it happened very luckily for him that the monarch's deceaſe happened without his having taken any of the medicines intended for him, as it would have been impoſſible to avoid the imputation of having poiſoned him, which would certainly have been reſented by his loyal ſubjects.

The king's death occaſioned great confuſion; the grandees being deſirous that it ſhould be concealed for ſome time. This, however, was found impoſſible; on which they ſet off for the *Mud Town* about 11 o'clock the ſame evening. All the inhabitants of the village followed their example; leaving only the dogs, who ſet up the moſt hideous howling. Captain Frederic Martin coming to take leave of the Engliſh, begged with great earneſtneſs for a freſh ſupply of gunpowder; whiſpering that the king was dead, and that they ſhould in all probability go to war about making another. They had been formerly told, that one who had the title of *duke* of Baba would certainly ſucceed to the throne; but they afterwards learned, that Philibey the general having eſpouſed the cauſe of *Raphani* the late king's ſon, and taken him under his tutelage and protection, this youth, who was only about

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16 years of age, succeeded his father as king of Bala.

The following is a deſcription of the ſouthern diviſion of the iſland, from the Abbé Rochon.

"That part of Madagaſcar in which Fort Dauphin is ſituated is very populous. Almoſt all the villages are placed on eminences, and ſurrounded with two rows of ſtrong paliſadoes, ſomewhat in the manner of ſuch of our fences as are compoſed of hurdles and turf. Within, is a parapet of ſolid earth about four feet in height; large pointed bamboos placed at the diſtance of five feet from each other, and ſunk in a pit, form a kind of loop-holes, which contribute towards the defence of theſe villages, ſome of which are beſides fortified with a ditch ten feet in breadth and ſix in depth. The dwelling of the chief is called a *donac*. When the chiefs go abroad, they are always provided with a muſket and a ſtick armed with iron, and adorned at the extremity with a little tuft of cow's hair. They wear a bonnet of red wool. It is chiefly by the colour of their bonnet that they are diſtinguiſhed from their ſubjects. Their authority is extremely limited: however, in the province of *Carcanoſſi*, the lands by cuſtom belong to their chiefs, who diſtribute them among their ſubjects for the purpoſes of cultivation; they exact a trifling quit-rent in return, which in their language is called *faenſa*. The people of Carcanoſſi are not altogether ignorant of the art of writing; they even poſſeſs ſome hiſtorical works in the Madagaſcar tongue: but their learned men, whom they term *Ombiaſſes*, make uſe of the Arabic characters alone. They have treatiſes on medicine, geomancy, and judicial aſtrology; the moſt renowned live in the province of *Matatane;* it is in that diſtrict that magic ſtill remains in all its glory; the Matanes are actually dreaded by the other Madecaſſees on account of their excellence in this deluſive art. The Ombiaſſes have public ſchools in which they teach geomancy and aſtrology. The natives have undoubtedly learned the art of writing from the Arabians, who made a conqueſt of this iſland about 300 years ſince.

"The people of the province of *Anoſſi*, near Fort Dauphin, are lively, gay, ſenſible, and grateful; they are paſſionately fond of women; are never melancholy in their company; and their principal occupation is to pleaſe the ſex; indeed, whenever they meet their wives, they begin to ſing and dance. The women, from being happy, are always in good humour. Their lively and cheerful character is extremely pleaſing to the Europeans. I have often been preſent at their aſſemblies, where affairs of importance have been agitated; I have obſerved their dances, their ſports, and their amuſements, and I have found them free from thoſe exceſſes which are but too common among poliſhed nations. Indeed I was too young as this time for my obſervations to be of much weight; but if my experience be inſufficient to inſpire confidence, I beg the reader will rather conſider the nature of things, than the relations given by men without principles or intelligence, who fancy that they have a right to tyrannize over the inhabitants of every country which they can ſubdue. If the people of Madagaſcar have ſometimes availed themſelves of treachery, they have been forced to it by the tyranny of the Europeans. The weak have always been oppreſſed by the ſtrong. Could they defend themſelves by any other means from our artillery and bayonets? They are unfortunate and helpleſs; and we avail ourſelves of their weakneſs, in order to make them ſubmit to our covetouſneſs and caprice. They receive the moſt cruel and oppreſſive treatment, in return for the hoſpitality which they generouſly beſtow on us; and we call them traitors and cowards, when we force them to break the yoke with which we have been pleaſed to load them."

In the ſecond volume of Count Benyowſky's Memoirs and Travels we have the following account of the religion, government, &c. of the people of this iſland.

"The Madagaſcar nation believe in a Supreme Being, whom they call *Zanhare*, which denotes creator of all things. They honour and revere this Being; but have dedicated no temple to him, and much leſs have they ſubſtituted idols. They make ſacrifices, by killing oxen and ſheep, and they addreſs all theſe libations to God. It has been aſſerted, that this nation likewiſe makes offerings to the devil: but in this there is a deception; for the piece of the ſacrificed beaſt which is uſually thrown into the fire is not intended in honour of the devil, as is uſually pretended. This cuſtom is very ancient, and no one can tell the true reaſon of it. With regard to the immortality of the ſoul, the Madagaſcar people are perſuaded, that, after their death, their ſpirit will return again to the region in which the Zanhare dwells; but they by no means admit that the ſpirit of man, after his death, can ſuffer any evil. As to the diſtinction of evil or good, they are perſuaded that the good and upright man ſhall be recompenſed, in this life, by a good ſtate of health, the conſtancy of his friends, the increaſe of his fortunes, the obedience of his children, and the happineſs of beholding the proſperity of his family: and they believe that the wicked man's fate ſhall be the contrary to this. The Madagaſcar people, upon this conviction, when they make oaths, add benedictions in favour of thoſe who keep them, and curſes againſt thoſe who break them. In this manner it is that they appeal to the judgement of Zanhare, in making agreements; and it has never been known, or heard of, that a native of Madagaſcar has broken his oath, provided it was made in the uſual manner, which they ſay was preſcribed by their forefathers.

"As to their kings and form of government, &c. the Madagaſcar people have always acknowledged the line of Ramini, as that to which the rights of Ampanſacabe or ſovereign belongs. They have conſidered this line as extinct ſince the death of Dian Ramini Larizon, which happened 66 years ago, and whoſe body was buried upon a mountain, out of which the river Manangourou ſprings; but having acknowledged the heir of this line on the female ſide, they re-eſtabliſhed this title in the year 1776. The right of the Ampanſacabe conſiſts in nominating the Rohandrians to aſſiſt in the cabars, at which all thoſe who are cited are bound to appear, and the judgement of the Ampanſacabe in his cabar is deciſive. Another prerogative of the Ampanſacabe is, that each Rohandrian is obliged to leave him by will a certain proportion of his property, which the ſucceſſors uſually purchaſe by a ſlight tribute or fine. Thirdly, The Ampanſacabe has a right to exact from each Rohandrian [illegible] tenth of the produce of his land, and a number of horned cattle and ſlaves, in proportion to the riches of the country poſſeſſed by each Rohandrian. The ſecond order is compoſed of the Rohandrians, or princes. Since the loſs of the Ampanſacabe, three of theſe Rohandrians have aſſumed the title of *kings*, namely the Rohandrian of the province of Mahavelou, named *Hiavi*; of the province of Voemar, named *Lambouin*; and a third at Bombetoki, named *Cimanounpou*. The third order conſiſts of the Voadziri, or lords of a diſtrict, compoſed of ſeveral villages. The fourth order conſiſts of the Lohavohits, or chiefs of villages. The fifth order, Ondzatzi, who are freemen, compoſe the attendants or followers of the Rohandrians, Voadziri, or Lohavohits. The ſixth order conſiſts of Ombiaſſes, or learned men; and this order forms the warriors, workmen, phyſicians, and diviners: theſe laſt poſſeſs no charge. The ſeventh order conſiſts of Amparias or ſlaves.

"Having made inquiries from Bombetoki paſſing to the northward, and as far as Itapere, the reſult proved that there are 38 Rohandrians actually reigning, and 287 Voadziri. With reſpect to the Lohavohits, Ondzatzi, and Ombiaſſes, it was not poſſible to obtain any accurate determination of their number. Theſe orders preſerve a regular gradation, reſpecting which it would be very difficult to give a detailed account. They live in the manner we read of concerning the ancient patriarchs. Every father of a family is prieſt and judge in his own houſe, though he depends upon the Lohavohits, who ſuperintends his conduct. This laſt is anſwerable to his Voadziri, and the Voadziri to the Rohandrian.

"The Madagaſcar people having no communication with the main land of Æthiopia, have not altered their primitive laws; and the language throughout the whole extent of the iſland is the ſame. It would be a raſh attempt to determine the origin of this nation; it is certain that it conſiſts of three diſtinct races, who have for ages paſt formed intermixtures which vary to infinity. The firſt race is that of Zafe Ibrahim, or deſcendants of Abraham; but they have no veſtige of Judaiſm, except circumciſion, and ſome names, ſuch as Iſaac, Reuben, Jacob, &c. This race is of a brown colour.—The ſecond race is that of Zaferamini: with reſpect to this, ſome books which are ſtill extant among the Ombiaſſes, affirm that it is not more than ſix centuries ſince their arrival at Madagaſcar.—With reſpect to the third race of Zafe Canambou, it is of Arabian extraction, and arrived much more lately than the others from the coaſts of Æthiopia: hence it poſſeſſes neither power nor credit, and fills only the charges of writers, hiſtorians, poets, &c.

"In regard to arts and trades, the Madagaſcar nation are contented with ſuch as are neceſſary to make their moveables, tools, utenſils, and arms for defence; to conſtruct their dwellings, and the boats which are neceſſary for their navigation; and laſtly, to fabricate cloths and ſtuffs for their clothing. They are deſirous only of procuring the neceſſary facilities of immediate utility and convenience. The principal and moſt reſpected buſineſs, is the manufacture of iron and ſteel. The artiſts in this way call themſelves *ampanefa vie*. They are very expert in fuſing the ore, and forging utenſils, ſuch as hatchets, hammers, anvils, knives, ſpades, ſagayes, razors, pincers or tweezers for pulling out the hair, &c. The ſecond claſs conſiſts of the goldſmiths (*ompanefa vola mena*): they caſt gold in ingots, and make up bracelets, buckles, earrings, drops, rings, &c. The third are called *ompavillanga*, and are potters. The fourth are the *ompanevatta*, or turners in wood, who make boxes called *vatta*, plates, wooden and born ſpoons, bee-hives, coffins, &c. The fifth *ompan cacaſou*, or carpenters. They are very expert in this buſineſs, and make uſe of the rule, the plane, the compaſſes, &c. The ſixth are the *ompan avi*, or ropemakers. They make their ropes of different kinds of bark of trees, and likewiſe of hemp. The ſeventh, *ampan lamba*, or weavers. This buſineſs is performed by women only, and it would be reckoned diſgraceful in a man to exerciſe it. The *ombiaſſes* are the literary men and phyſicians, who give advice only. The *herauvitz* are comedians and dancers.

"The Madagaſcar people always live in ſociety; that is to ſay, in towns and villages. The towns are ſurrounded by a ditch and palliſades (as already mentioned), at the extremities of which a guard of from 12 to 20 armed men is kept. The houſes of private people conſiſt of a convenient cottage, ſurrounded by ſeveral ſmall ones: the maſter of the houſe dwells in the largeſt, and his women or ſlaves lodge in the ſmaller. Theſe houſes are built of wood, covered with leaves of the palm tree or ſtraw.

"The houſes of the great men of the country are very ſpacious; each houſe is compoſed of two walls and four apartments: round about the principal houſe other ſmaller habitations are built for the accommodation of the women, and the whole family of the chief; but the ſlaves cannot paſs the night within them.—Moſt of the houſes inhabited by the Rohandrians are built with taſte and admirable ſymmetry."

The French attempted to conquer and take poſſeſſion of the whole iſland, by order, and for the uſe of, their Moſt Chriſtian Majeſties Louis XIII. and XIV. and they maintained a footing on it from the year 1642 to 1657. During this period, by the moſt cruel treachery, they taught the native princes the barbarous traffic in ſlaves, by villanouſly ſelling to the Dutch governor of Mauritius a number of innocent people, who had been aſſiſting them in forming a ſettlement at Fort Dauphin.

The Abbé Rochon tells us, that the inſalubrity of the air in Madagaſcar determined his countrymen in 1664 to quit that immenſe iſland, in order to eſtabliſh themſelves at ſo inconſiderable a place as the Iſle of Bourbon, which is ſcarcely perceptible in a map of the globe: but it is apparent, from the account of the ſtate of the French affairs on the iſland of Madagaſcar, in 1661, when Flacourt's narrative was publiſhed, that their ill treatment of the natives had raiſed ſuch a general and formidable oppoſition to their reſidence in the country, that the French were obliged to abandon their poſſeſſions for other reaſons than the unhealthy qualities of the climate. We have not room here for a detail of all the oppreſſive meaſures of the French, which the abbé himſelf candidly cenſures in the ſtrongeſt terms; but ſhall extract the following narrative, both becauſe it is intereſting in itſelf, and exhibits the cauſes and the means of their expulſion.

adagaſcar.

La Caſe, one of the French officers employed by the governor of Fort Dauphin againſt the natives, was ſo ſucceſsful in all his enterpriſes, that they called him *Deaan Pouſ*, the name of a chief who had formerly conquered the whole iſland. The French governor, jealous of his renown, treated him harſhly, and refuſed to allow him the rank or honours due to his valour. The ſovereign of the province of Amboulle, called *Deaan Raſcitat*, taking advantage of his diſcontent, prevailed on him to become his general. Five Frenchmen followed him. Deaan Nong, the daughter of Raſcitat, captivated by the perſon and heroiſm of La Caſe, offered him her hand with the conſent of her father. The chief, grown old, infirm, and arrived at the laſt ſtage of exiſtence, had the ſatisfaction of ſecuring the happineſs of his ſubjects, by appointing his ſon-in-law abſolute maſter of the rich province of Amboulle. La Caſe, in marrying Deaan Nong, refuſed to take the titles and honours attached to the ſovereign power: he would accept of no other character, than that of the firſt ſubject of his wife, who was declared ſovereign at the death of her father. Secure in the affection of this princeſs, who was not only poſſeſſed of perſonal charms, but of courage and great qualities, he was beloved and reſpected by her family, and by all the people of Amboulle, who reverenced him as a father; and yet, how much ſoever he wiſhed it, he was unable to contribute to the proſperity of his countrymen at Fort Dauphin, whom he knew to be in the utmoſt diſtreſs. The governor, regarding him as a traitor, had ſet a price on his head, and on the heads of the five Frenchmen who had followed him. The neighbouring chiefs, irritated at this treatment of a man whom they ſo much venerated, unanimouſly refuſed to ſupply the fort with proviſions. This occaſioned a famine in the place, which, with a contagious fever and other maladies, reduced the French garriſon to 80 men.

The eſtabliſhment at Fort Dauphin, on the point of being totally deſtroyed, was preſerved for a ſhort time from ruin by the arrival of a veſſel from France, commanded by Kercadio an officer of Britanny, who, with the aſſiſtance of a young advocate who had been kidnapped on board the veſſel, prevailed on the envious and implacable governor Chamargou to make peace with La Caſe and his ſovereign ſpouſe Deaan Nong. This peace, however, laſted but for a ſhort time; the French, reſtleſs and inſolent to the neighbouring nations, again drew on them the vengeance of the natives. Even the few friends whom they had been able to acquire by means of La Caſe, were rendered hoſtile to them by the tyrannic zeal of the miſſionaries; who, not contented with being tolerated and allowed to make converts, inſiſted on Deaan Manang, ſovereign of Mandrarey, a powerful, courageous, and intelligent chief, well diſpoſed to the French, to divorce all his wives but one. This prince, not convinced of the neceſſity of ſuch a meaſure, aſſured them that he was unable to change his habits and way of living, which were thoſe of his forefathers. "You would allow me (ſays he) to have one wife; but if the poſſeſſion of one woman is a bleſſing, why ſhould a numerous ſeraglio be an evil, while peace and concord reign among thoſe of whom it is compoſed? Do you ſee among us any indications of jealouſy or hatred? No, all our women are good; all try to make me happy; and I am more their ſlave than their maſter." This ſpeech had no effect on Father Stephen, ſuperior of the Madagaſcar miſſion. He peremptorily ordered him inſtantly to repudiate all his wives except one; and threatened, in preſence of the women, to have them taken from him by the French ſoldiers, if he heſitated in complying with his commands. It is eaſy to imagine, ſays M. Rochon, with what indignation this language muſt have been heard in the *donac* or palace of this prince. The females aſſailed the miſſionary on all ſides; loaded him with execrations and blows; and, in their fury, would doubtleſs have afforded him no more quarter than the Thracian women did Orpheus, if Deaan Manang, notwithſtanding his own agitation, had not made uſe of all his authority to ſave him.

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In order to free himſelf from the perſecution of this prieſt, he removed with his family 70 or 80 miles up into the country; but he was ſoon followed by Father Stephens and another miſſionary, with their attendants. The chief, Manang, ſtill received them civilly; but he intreated them no longer to inſiſt on the converſion of him and his people, as it was impoſſible to oblige them to quit the cuſtoms and manners of their anceſtors. The only reply which Father Stephen made to this intreaty, was by tearing off the *oli*, and the amulets and charms which the chief wore as ſacred badges of his own religion; and, throwing them into the fire, he declared war againſt him and his nation. This violence inſtantly coſt him and his followers their lives: they were all maſſacred by order of Manang, who vowed the deſtruction of all the French in the iſland; in which intention he proceeded in a manner that has been related by an eyewitneſs, who was afterwards provincial commiſſary of artillery, in a narrative publiſhed at Lyons in 1722, entitled, *Voyage de Madagaſcar.* "Our yoke (ſays the Abbé Rochon) was become odious and inſupportable. Hiſtorians, for the honour of civilized nations, ſhould bury in oblivion the afflicting narratives of the atrocities exerciſed on theſe people, whom we are pleaſed to call barbarous, treacherous, and deceitful, becauſe they have revolted againſt European adventurers, whoſe leaſt crime is that of violating the ſacred rites of hoſpitality."

It was about the year 1672 that the French were totally driven from the iſland of Madagaſcar; and no conſiderable attempts were made to form freſh eſtabliſhments there till within theſe few years, by M. de Modave, and by Count Benyowſki; neither of which was attended with ſucceſs, for reaſons given by the Abbé, but which we have not room to detail.

MADDER, a plant uſed in dyeing. See Rubia, Botany *Index;* and for its dyeing properties, ſee Dyeing.

MADEIRAS, a cluſter of iſlands ſituated in the Atlantic ocean in W. Long. 16°, and between 32° and 33° N. Lat.—The largeſt of them, called *Madeira*, from which the reſt take their name, is about 55 Engliſh miles long, and 10 miles broad; and was firſt diſcovered on the 2d of July, in the year 1419, by Joao Gonzales Zarco, there being no hiſtorical foundation for the fabulous report of its diſcovery by one Machin an Engliſhman. It is divided into two capitaines, named *Funchal* and *Machico*, from the towns of thoſe names. The former contains two judicatures, viz. Funchal and Calhetta; the latter being a town with the title of a county, belonging to the family of Caſtello Mellor. The ſecond capitania likewiſe comprehends two judicatures, viz. Maxico (read Mathico) and San Vicente.

Funchal is the only citadel or city in the iſland, which has alſo ſeven villas or towns; of which there are four, Calhetta, Camara de Lobos, Ribeira Braba, and Ponta de Sol in the capitania of Funchal, which is divided into 26 pariſhes. The other three are in the capitania of Maxico, which conſiſts of 17 pariſhes; theſe towns are called *Maxico*, *San Vicente*, and *Santa Cruz*.

There is one curioſity in the town of Funchal, which deſerves to be taken notice of, and that is a chamber in one of the corners of the Franciſcan convent, the walls and ceiling of which are completely covered with rows of human ſkulls and human thigh bones, ſo arranged that in the obtuſe angle made by each pair of the latter, croſſing each other obliquely, is placed a ſkull. The only vacant ſpace that appears is in the centre of the ſide oppoſite to the door, on which there is an extraordinary painting above a kind of altar, but what the ſubject it is intended to repreſent, it is difficult to determine. A figure probably intended for St Francis, the patron ſaint, ſeems to be intent on trying in a balance the comparative weight of a ſinner and a ſaint. A dirty lamp ſuſpended from the ceiling, and juſt glimmering in the ſocket, ſerves dimly to light up this diſmal den of ſkulls. The monk who attends as ſhewman, is careful to impreſs on the minds of thoſe who viſit it, the idea that they are all relicks of holy men who died on the iſland, although Mr Barrow is of opinion that the church-yard muſt have been frequently robbed, in order to accumulate ſuch a prodigious number of ſkulls, which from a rough computation made by that gentleman, could not be under 3000.

The governor is at the head of all the civil and military departments of this iſland, of Porto-Santo, the Salvages, and the Ilhas Deſartas; which laſt only contain the temporary huts of ſome fiſhermen, who reſort thither in purſuit of their buſineſs; his ſalary is computed to be worth 2000l. per annum, 200l. of which is in the form of a preſent from the Engliſh merchants.

The law department is under the corregidor, who is appointed by the king of Portugal, commonly ſent from Liſbon, and holds his place during the king's pleaſure. All cauſes come to him from inferior courts by appeal. Each judicature has a ſenate; and a *Juiz* or judge, whom they chooſe, preſides over them. At Funchal he is called *Juiz da Fora;* and in the abſence, or after the death of the corregidor, acts as his deputy. The foreign merchants elect their own judges, called the *Providor*, who is at the ſame time collector of the king's cuſtoms and revenues, which amount in all to about 12,000l. ſterling. Far the greateſt part of this ſum is applied towards the ſalaries of civil and military officers, the pay of troops, and the maintenance of public buildings. This revenue ariſes, firſt from the tenth of all the produce of this iſland belonging to the king, by virtue of his office as grand maſter of the order of Chriſt; ſecondly, From ten per cent. duties laid on all imports, proviſions excepted; and laſtly, From the eleven per cent. charged on all exports.

The iſland has but one company of regular ſoldiers of 100 men: the reſt of the military force is a militia conſiſting of 3000 men, divided into companies, each commanded by a captain, who has one lieutenant under him and one enſign. There is no pay given to either the private men or the officers of this militia; and yet their places are much ſought after, on account of the rank which they communicate. Theſe troops are embodied once a-year, and exerciſed once a-month. All the military are commanded by the *Serjeante Mór*. The governor has two *Capitanos de Sal* about him, who do duty as aides de-camp.

The ſecular prieſts on the iſland are about 1200, many of whom are employed as private tutors. Since the expulſion of the Jeſuits, no regular public ſchool is to be found here: unleſs we except a ſeminary, where a prieſt, appointed for that purpoſe, inſtructs and educates ten ſtudents at the king's expence. Theſe wear a red cloak over the uſual black gowns worn by ordinary ſtudents. All thoſe who intend to go into orders, are obliged to qualify themſelves by ſtudying in the univerſity of Coimbra, lately re-eſtabliſhed in Portugal. There is alſo a dean and chapter at Madeira, with a biſhop at their head, whoſe income is conſiderably greater than the governor's; it conſiſts of 110 pipes of wine, and of 40 muys of wheat, each containing 24 buſhels; which amounts in common years to 3000l. ſterling. Here are likewiſe 60 or 70 Franciſcan friars, in four monaſteries, one of which is at Funchal. About 300 nuns live on the iſland, in four convents, of the order of Merci, Sta Clara, Incarnacao, and Dom Jeſus. Thoſe of the laſt mentioned inſtitution may marry whenever they chooſe, and leave their monaſtery.

In the year 1768, the inhabitants living in the 43 pariſhes of Madeira, amounted to 63,913, of whom there were 31,341 males and 32,572 females. But in that year 5243 perſons died, and no more than 2198 children were born; ſo that the number of the dead exceeded that of the born by 3045. It is highly probable that ſome epidemical diſtemper carried off ſo diſproportionate a number in that year, as the iſland would ſhortly be entirely depopulated if the mortality were always equal to this. Another circumſtance concurs to ſtrengthen this ſuppoſition, namely, the excellence of the climate. The weather is in general mild and temperate: in ſummer, the heat is very moderate on the higher parts of the iſland, whither the better ſort of people retire for that ſeaſon; and in the winter the ſnow remains there for ſeveral days, whilſt it is never known to continue above a day or two in the lower parts.

The common people of this iſland are of a tawny colour, and well ſhaped; though they have large feet, owing perhaps to the efforts they are obliged to make in climbing the craggy paths of this mountainous country. Their faces are oblong, their eyes dark; their black hair naturally falls in ringlets, and begins to criſp in ſome individuals, which may perhaps be owing to intermarriages with negroes; in general, they are hard featured, but not diſagreeable. Their women are too frequently ill favoured, and want the florid complexion, which, when united to a pleaſing aſſem-

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blage of regular features, gives our northern fair ones the ſuperiority over all their ſex. They are ſmall, have prominent cheek bones, large feet, an ungraceful gait, and the colour of the darkeſt brunette. The juſt proportion of the body, the fine form of their hands, and their large lively eyes, ſeem in ſome meaſure to compenſate for thoſe defects. The labouring men, in ſummer, wear linen trowſers, a coarſe ſhirt, a large hat, and boots; ſome have a ſhort jacket made of cloth, and a long cloak, which they ſometimes carry over their arm. The women wear a petticoat, and a ſhort corſelet or jacket, cloſely fitting their ſhapes, which is a ſimple, and often not an inelegant, dreſs. They have alſo a ſhort but wide cloak; and thoſe that are unmarried tie their hair on the crown of their head, on which they wear no covering.

The country people are exceeding ſober and frugal; their diet in general conſiſting of bread and onions, or other roots, and little animal food. However, they avoid eating tripe, or any offals, becauſe it is proverbially ſaid of a very poor man, "He is reduced to eat tripe." Their common drink is water, or an infuſion of the remaining rind or ſkin of the grape (after it has paſſed through the wine preſs), which when fermented acquires ſome tartneſs and acidity, but cannot be kept very long. The wine for which the iſland is ſo famous, and which their own hands prepare, ſeldom if ever regales them.

Their principal occupation is the planting and raiſing of vines; but as that branch of agriculture requires little attendance during the greateſt part of the year, they naturally incline to idleneſs. The warmth of the climate, which renders great proviſion againſt the inclemencies of weather unneceſſary, and the eaſe with which the cravings of appetite are ſatisfied, muſt tend to indolence, wherever the regulations of the legiſlature do not counteract it, by endeavouring, with the proſpect of increaſing happineſs, to infuſe the ſpirit of induſtry. It ſeems the Portugueſe government does not purſue the proper methods againſt this dangerous lethargy of the ſtate. They have lately ordered the plantation of olive trees here, on ſuch ſpots as are too dry and barren to bear vines; but they have not thought of giving temporary aſſiſtance to the labourers, and have offered no premium by which theſe might be induced to conquer their reluctance to innovations and averſion to labour.

The vineyards are held only on an annual tenure, and the farmer reaps but four-tenths of the produce, ſince other four tenths are paid in kind to the owner of the land, one tenth to the king, and one to the clergy. Such ſmall profits, joined to the thought of toiling merely for the advantage of others, if improvements were attempted, entirely preclude the hopes of a future increaſe. Oppreſſed as they are, they have however preſerved a high degree of cheerfulneſs and contentment; their labours are commonly alleviated with ſongs, and in the evening they aſſemble from different cottages to dance to the drowſy muſic of a guitar.

The inhabitants of the towns are more ill favoured than the country people, and often pale and lean. The men wear French clothes, commonly black, which do not ſeem to fit them, and have been in faſhion in the polite world about half a century ago. The ladies are delicate, and have agreeable features: but the characteriſtic jealouſy of the men ſtill locks them up, and deprives them of a happineſs which the country women, amidſt all their diſtreſſes, enjoy. Many of the better people are a ſort of *petite nobleſſe*, which we would call *gentry*, whoſe genealogical pride makes them unſociable and ignorant, and cauſes a ridiculous affectation of gravity. The landed property is in the hands of a few ancient families, who live at Funchal, and in the various towns on the iſland.

Madeira conſiſts of one large mountain, whoſe branches riſe everywhere from the ſea towards the centre of the iſland, converging to the ſummit, in the midſt of which is a depreſſion or excavation, called the *Val* by the inhabitants, always covered with a freſh and delicate herbage. The ſtones on the iſland ſeem to have been in the fire, are full of holes, and of a blackiſh colour; in ſhort, the greater part of them are lava. A few of them are of the kind which the Derbyſhire miners call *dunſtone*. The ſoil of the whole iſland is a tarras mixed with ſome particles of clay, lime, and ſand, and has much the ſame appearance as ſome earths on the iſle of Aſcenſion. From this circumſtance, and from the excavation of the ſummit of the mountain, it is probable, that in ſome remote period a volcano has produced the lava and the ochreous particles, and that the Val was formerly its crater.

Many brooks and ſmall rivulets deſcend from the ſummits in deep chaſms or glens, which ſeparate the various parts of the iſland. The beds of the brooks are in ſome places covered with ſtones of all ſizes, carried down from the higher parts by the violence of winter rains or floods of melted ſnow. The water is conducted by wears and channels in the vineyards, where each proprietor has the uſe of it for a certain time; ſome being allowed to keep a conſtant ſupply of it, ſome to uſe it thrice, others twice, and others only once a-week. As the heat of the climate renders this ſupply of water to the vineyards abſolutely neceſſary, it is not without great expence that a new vineyard can be planted; for the maintenance of which, the owners muſt purchaſe water at a high price, from thoſe who are conſtantly ſupplied, and are thus enabled to ſpare ſome of it.

Wherever a level piece of ground can be contrived in the higher hills, the natives make plantations of eddoes encloſed by a kind of dike to cauſe a ſtagnation, as that plant ſucceeds beſt in ſwampy ground. Its leaves ſerve as food for hogs, and the country people uſe the roots for their own nouriſhment.

The ſweet potato is planted for the ſame purpoſe, and makes a principal article of diet; together with cheſnuts, which grow in extenſive woods, on the higher parts of the iſland, where the vine will not thrive. Wheat and barley are likewiſe ſown, eſpecially in ſpots where the vines are decaying through age, or where they are newly planted. But the crops do not produce above three months proviſions; and the inhabitants are therefore obliged to have recourſe to other food, beſides importing conſiderable quantities of corn from North America in exchange for wine. The want of manure, and the [illegible] of the [illegible], are in ſome meaſure the cauſes of this [illegible]; but [illegible] huſbandry to be carried to its [illegible].

[illegible] here, they could not take even ſufficient for their conſumption. They uſe their threſhing floors of a circular form, in the center of a field, which is cleared and beaten hard for the purpoſe. The ſheaves are laid round about it, and a ſquare board, ſtuck full of ſharp flint ſtones, is dragged over them by a pair of oxen, the driver getting on it to increaſe its weight. This method cuts the ſtraw as if it had been chopped, and frees the grain from the huſk, from which it is afterwards ſeparated.

The great produce of Madeira is the wine, from which it has acquired fame and ſupport. Where the ſoil, expoſure, and ſupply of water, will admit of it, the vine is cultivated. One or more walks, about a yard or two wide, interſect each vineyard, and are included by ſtone walls two feet high. Along theſe walks, which are arched over with laths about ſeven feet high, they erect wooden pillars at regular diſtances, to ſupport a lattice-work of bamboos, which ſlopes down from both ſides of the walk, till it is only a foot and a half or two feet high, in which elevation it extends over the whole vineyard. The vines are in this manner ſupported from the ground, and the people have room to root out the weeds which ſpring up between them. In the ſeaſon of the vintage, they creep under this lattice work, cut off the grapes, and lay them into baſkets: ſome bunches of theſe grapes weigh ſix pounds and upwards. This method of keeping the ground clean and moiſt, and ripening the grapes in the ſhade, contributes to give the Madeira wines that excellent flavour and body for which they are remarkable. The owners of vineyards are however obliged to allot a certain ſpot of ground for the growth of bamboos; for the lattice-work cannot be made without them: and it is ſaid ſome vineyards lie quite neglected for want of this uſeful reed.

The wines are not all of equal goodneſs, and conſequently of different prices. The beſt, made of a vine imported from Candia by order of the Infante of Portugal, Don Henry, is called *Madeira Malmſey*, a pipe of which cannot be bought on the ſpot for leſs than 40l. or 42l. ſterling. It is an exceeding rich ſweet wine, and is only made in a ſmall quantity. The next ſort is a dry wine, ſuch as is exported for the London market, at 30l. or 31l. ſterling the pipe. Inferior ſorts for the Eaſt India, Weſt India, and North American markets, ſell at 28l. 25l. and 20l. ſterling. About 30,000 pipes, upon a mean, are made every year, each containing 110 gallons. About 13,000 pipes of the better ſorts are exported: and all the reſt is made into brandy for the Brazils, converted into vinegar, or conſumed at home.

The largeſt quantity of this article exported in the courſe of one year, is ſaid to have amounted to 15,000 pipes, valued at 500,000l. of which 5,500 pipes were ſent to the Eaſt Indies, 4,500 to England, 3,000 to to the Weſt Indies, and 2,000 to America.

The encloſures of the vineyards conſiſt of walls, and hedges of prickly pear, pomegranates, myrtles, brambles, and wild roſes. The gardens produce peaches, apricots, quinces, apples, pears, walnuts, cheſnuts, and many other European fruits; together with now and then ſome tropical plants, ſuch as bananas, goavas, and pine-apples.

All the common domeſtic animals of Europe are likewiſe found at Madeira; and their mutton and beef, though ſmall, is very well taſted. Their horſes are ſmall, but ſure-footed; and with great agility climb the difficult paths, which are the only means of communication in the country. They have no wheel-carriages of any kind: but in the town they uſe a ſort of drays or ſledges, formed of two pieces of plank joined by croſs pieces, which make an acute angle before; theſe are drawn by oxen, and are uſed to tranſport caſks of wine, and other heavy goods, to and from the warehouſes.

The animals of the feathered tribe, which live wild here, are more numerous than the wild quadrupeds; there being only the common gray rabbit here, as a repreſentative of the laſt-mentioned claſs. Tame birds, ſuch as turkeys, geeſe, ducks, and hens, are very rare, which is perhaps owing to the ſcarcity of corn.

There are no ſnakes whatſoever in Madeira; but all the houſes, vineyards, and gardens, ſwarm with lizards. The friars of one of the convents complained to Mr Forſter, that theſe vermine deſtroyed the fruit in their garden; they had therefore placed a braſs-kettle in the ground to catch them, as they are conſtantly running about in queſt of food. In this manner they daily caught hundreds, which could not get out on account of the ſmooth ſides of the kettle, but were forced to periſh.

The ſhores of Madeira, and of the neighbouring Salvages and Deſertas, are not without fiſh; but as they are not in plenty enough for the rigid obſervance of Lent, pickled herrings are brought from Gottenburg in Engliſh bottoms, and ſalted cod from New York and other American ports, to ſupply the deficiency.

MADIAN, in *Ancient Geography*, a town of Arabia Petræa, near the Arnon; ſo called from one of the ſons of Abraham by Ketura, in ruins in Jerome's time. Jerome mentions another MADIAN, or MIDIAN, beyond Arabia, in the deſert, to the ſouth of the Red ſea; and hence *Madianæi*, and *Madianitæi*, the people; and *Madianæa Regio*, the country.

MADNESS, a moſt dreadful kind of delirium, without fever. See MEDICINE *Index*.

MADRAS. See *St George*.

MADRE DE POPA, a town and convent of South America, in Terra Firma, ſeated on the river Grande. It is almoſt as much reſorted to by pilgrims of America as Loretto is in Europe; and the image of the Virgin Mary is ſaid to have done many miracles in favour of the ſeafaring people. W. Long. 76. 0. N. Lat. 11. 0.

MADREPORA, in *Natural Hiſtory*, the name of a genus of ſubmarine ſubſtances; belonging to the order lithophyta. See HELMINTHOLOGY *Index*.

MADRID, a town of New Caſtile in Spain, and capital of the whole kingdom, though it never had the title of a *city*, is ſituated in W. Long. 3. 5. N. Lat. 40. 26. It ſtands in the centre of a large plain, ſurrounded with mountains, and in the very heart of Spain, on the banks of the little river Manzanares, which is always very low and ſhallow, except when it is ſwelled by the melting of the ſnow on the mountains. The city is in general well laid out; the ſtreets are very handſome; and the houſes are fair and lofty, but built of brick, with lattice-windows, excepting thoſe of the rich, who have glaſs in their windows; only, during the ſummer heats, they uſe gauze, or ſome ſuch thin ſtuff, inſtead of it, to let in the freſh air. There are two ſtately bridges here over the Manzanares, a great many magnificent churches, convents, hoſpitals, and palaces. The royal palace, which ſtands on the weſt ſide of the town, on an eminence, is ſpacious and magnificent, conſiſting of three courts, and commanding a fine proſpect. At the eaſt end of the town is the prado, or pardo; which is a delightful plain, planted with regular rows of poplar trees, and watered with a great many fountains; where the nobility and gentry take the air on horſeback, or in their coaches, and the common people on foot, or divert themſelves with a variety of ſports and exerciſes. Almoſt all the ſtreets of Madrid are ſtraight, wide, clean, and well paved. The largeſt and moſt frequented are the ſtreet of Alcala, that of Atocha, that of Toledo, and the *Calle Grande* or great ſtreet. Madrid has alſo ſeveral ſquares, which in general are not very regular. The principal are thoſe of San Joachim, Sol, Laſganitas, San Domingo, La Cevado, and the Plaza Mayor. The latter eſpecially deſerves notice for its ſpacioufneſs and regularity, and the elegant and lofty houſes it contains. It is 1536 feet in circuit. The houſes, of which there are 136, are of five ſtories, ornamented with balconies; the firſt of which, ſupported by pillars, forms a piazza round the ſquare, where the inhabitants may walk under cover. In the middle of the ſquare a market is kept.—The ſtreets and ſquares of Madrid, except the Plaza Mayor which has been juſt deſcribed, are ornamented with fountains in a very ill taſte. Thoſe moſt to be diſtinguiſhed in this particular are the fountain of the ſmall irregular ſquare called *Plaza di Antonio Martin*, and that of the ſquare named *Puerta del Sol*. The others are not more magnificent though leſs ridiculous. The water of all theſe fountains is excellent; and the air of Madrid, though the weather be variable and uncertain, is extremely pure. It was this purity of the air and excellent quality of the water which induced Philip II. and his ſucceſſors to fix their reſidence in this city. It is alſo well ſupplied with proviſions of all kinds at reaſonable rates; and the court, with the reſort and reſidence of the quality, and the high colleges and offices that are kept here, occaſion a briſk trade and circulation of money.

The ſacred edifices in this city have nothing remarkable in their architecture; thoſe of St Paſqual, St Iſabella, and the Carmelites, contain highly valuable collections of pictures, which may be ſeen with admiration even after the paintings of the Eſcurial and the new palace. The church of St Iſidro, which heretofore belonged to the Jeſuits, has a portal which has eſcaped the contagion of the age in which it was built. There is another church much more modern, which on account of its maſs has a venerable appearance, but which true taſte may juſtly diſavow: it is that of St Saleſas, or the Viſitation, founded by Ferdinand VI. and the queen Barbara his wife.—The convent of St Francis has already been ſome years building [*], and there are hopes that it will become one of the fineſt productions of architecture in the capital.—Beſides a variety of charitable foundations, there are here three confraternities, the revenues of which are appropriated to the ſuccour of the wretched; and an inſtitution ſimilar to the *Mont de Piété* in Paris, the principal object of which is to advance money to the neceſſitous.

The city of Madrid contains 15 gates, 18 pariſhes, 35 convents of monks, and 31 of nuns; 39 colleges, hoſpitals, or houſes of charity; 7398 dwelling-houſes, and about [illegible] inhabitants. The [illegible] traveller, Father Caimo, tells us, that 50,000 ſheep and 12,000 oxen are annually conſumed there; to which his editor has added a ludicrous eſtimate of the onions and leeks devoured there, which he ſays amount to 97[illegible]. But this writer (M. Bourgoanne obſerves) would not at preſent have any reaſon to complain of the diſagreeable ſmells of the ſtreets, nor would he find all the perfumes of Arabia neceſſary to defend himſelf from them. By the vigilance of the modern police, for which (M. Bourgoanne informs us) it is indebted to the Count d'Aranda, it is rendered one of the cleaneſt cities in Europe.

There are four academies in Madrid: The firſt is the Spaniſh academy, founded in 1714, in imitation of the French academy, and conſiſting of 24 members, including the preſident. Its device is a crucible on burning coals, with the motto *Limpia, fija, y da eſplender*; "it purifies, fixes, and gives luſtre." Its firſt object was the compilation of a dictionary of the Spaniſh language, which was publiſhed in ſix volumes folio, and of which a new edition, with great additions, has been lately put to the preſs. The ſame academy is alſo employed on a ſuperb edition of Don Quixotte, adorned with elegant engravings far ſuperior to the laſt, and collated with all the former editions. The ſecond is the academy of hiſtory; which owes its origin to a ſociety of individuals, the object of whoſe meetings was to preſerve and illuſtrate the hiſtorical monuments of the kingdom of Spain. Their labours met the approbation of Philip V. who in 1738 confirmed the ſtatutes by a royal cedula. This academy conſiſts of 24 members, including the preſident, ſecretary, and cenſor. Its device is a river at its ſource; and the motto, *In patriam populumque fluit*. The other two academies are, the academy of the fine arts, painting, ſculpture, and architecture; and the academy of medicine. The latter is held in no great eſteem.

The environs of Madrid contain ſeveral royal ſeats; among which are El Buen Retiro, Caſa del Campo, Florida, Le Pardo Sarſuela, and St Ildefonſo; but the moſt magnificent not only in this country but perhaps in the whole world is the Eſcurial, which takes its name from a ſmall village near which it ſtands, about 22 miles north-weſt from Madrid; and of which a deſcription is given under the article ESCURIAL. Another royal palace, greatly admired, particularly for its delicious gardens and ſurpriſing water-works, is Aranjuez, which is ſituated on the Tagus, about 30 miles ſouth of Madrid. See ARANJUEZ.

MADRIGAL, a ſhort amorous poem, compoſed of a number of free and unequal verſes, neither confined to the regularity of a ſonnet, nor to the point of an epigram; but only conſiſting of ſome tender and delicate thought, expreſſed with a beautiful, noble, and elegant ſimplicity.

Menage derives the word from *mandra*, which in Latin and Greek, ſignifies "a [illegible];" [illegible]

[*] Bourgoanne's Travels in Spain, 1789.

it to have been originally a kind of paſtoral or ſhepherd's ſong; whence the Italians formed their *madrigal*, and we *madrigal*. Others rather chooſe to derive it from the word *madrugar*, which in the Spaniſh language ſignifies "to riſe in the morning;" the *madrigals* being formerly ſung early in the morning by thoſe who had a mind to ſerenade their miſtreſſes.

MADURA, a province of Aſia, in the peninſula on this ſide the Ganges; bounded on the eaſt by Tanjour and Marava, on the ſouth eaſt by the ſea, on the weſt by the Balagate mountains, which ſeparate it from Malabar, and on the north by Viſiapour and Carnate. The inhabitants are Gentoos, and of a thieviſh diſpoſition. The commodities are rice, elephants teeth, and cotton cloth; of which laſt a great deal is made here, and very fine. The Dutch have a pearl fiſhery, which brings them in a large ſum annually.

MÆANDER, in *Ancient Geography*, a celebrated river of Aſia Minor, riſing near Celænæ. It flows through Caria and Ionia into the Ægean ſea between Miletus and Priene, after it has been increaſed by the waters of the Marſyas, Lycus Eudon, Lethæus, &c. It is celebrated among the poets for its windings, which amount to not leſs than 600, and from which all obliquities have received the name of *mæanders*. It forms in its courſe, according to the obſervation of ſome travellers, the Greek letters ε ζ ξ ς & ω; and from its windings Dædalus is ſaid to have had the firſt idea of his famous labyrinth.

MÆATÆ, anciently a people of Britain, near Severus's wall, inhabiting the diſtrict now called *Lauderdale*. in Scotland.

MÆCENAS, Caius Cilnius, the great friend and counſellor of Auguſtus Cæſar, was himſelf a very polite ſcholar, but is chiefly memorable for having been the patron and protector of men of letters. He was deſcended from a moſt ancient and illuſtrious origin, even from the kings of Hetruria, as Horace often tells us; but his immediate forefathers were only of the equeſtrian order. He is ſuppoſed to have been born at Rome, becauſe his family lived there; but in what year, antiquity does not tell us. It ſays as little about his education; but we know it muſt have been of the moſt liberal kind, and perfectly agreeable to the dignity and ſplendour of his birth, ſince he excelled in every thing that related to arms, politics, and letters. How Mæcenas ſpent his younger years is alſo unknown to us, any farther than by effects; there being no mention made of him by any writer before the death of Julius Cæſar, which happened in the year of Rome 709. Then Octavius Cæſar, who was afterwards called *Auguſtus*, went to Rome, to take poſſeſſion of his uncle's inheritance; and then Mæcenas became firſt publicly known, though he appears to have been Auguſtus's intimate friend, and as it ſhould ſeem guardian, from his childhood. From that time he accompanied him through all his fortunes, and was his counſellor and adviſer upon all occaſions; ſo that Pædo Albinovanus juſtly called him *Cæſaris dextram*, "Cæſar's right-hand."

In A. R. 710, the year that Cicero was killed and Ovid born, Mæcenas diſtinguiſhed himſelf by his courage and military ſkill at the battle of Modena, where the conſuls Hirtius and Panſa were ſlain in fighting againſt Antony; as he did afterwards at Philippi. After this laſt battle began the memorable friendſhip between Mæcenas and Horace. Horace, as Suetonius relates, was a tribune in the army of Brutus and Caſſius, and upon the defeat of thoſe generals made a priſoner of war. Mæcenas, finding him an accompliſhed man, became immediately his friend and protector; and afterwards recommended him to Auguſtus, who reſtored to him his eſtate with no ſmall additions. In the mean time, though Mæcenas behaved himſelf well as a ſoldier in theſe and other battles, yet his principal province was that of a miniſter and counſellor. He was the adviſer, the manager, the negociator, in every thing that related to civil affairs. When the league was made at Brunduſium between Antony and Auguſtus, Mæcenas was ſent to act on the part of Auguſtus. This we learn from Horace in his journey to Brunduſium:

Huc venturus erat Mæcenas optimus, atque
Cocceius, miſſi magnis de rebus uterque
Legati, averſos ſoliti componere amicos. Sat. v. lib. I.

And afterwards, when this league was near breaking, through the ſuſpicions of each party, Macænas was ſent to Antony to ratify it anew.

In the year 717, when Auguſtus and Agrippa went to Sicily to fight Sextus Pompeius by ſea, Mæcenas went with them; but ſoon after returned, to appeaſe ſome commotions which were riſing at Rome: for though he uſually attended Auguſtus in all his military expeditions, yet whenever there was any thing to be done at Rome either with the ſenate or people, he was always deſpatched thither for that purpoſe.

Upon the total defeat of Antony at Actium, Mæcenas returned to Rome, to take the government into his hands, till Auguſtus could ſettle ſome neceſſary affairs in Greece and Aſia. Agrippa ſoon followed Mæcenas; and when Auguſtus arrived, he placed theſe two great men and faithful adherents, the one over his civil, the other over his military concerns. While Auguſtus was extinguiſhing the remains of the civil war in Aſia and Egypt, young Lepidus, the ſon of the triumvir, was forming a ſcheme to aſſaſſinate him at his return to Rome. This conſpiracy was diſcovered at once, by the extraordinary vigilance of Mæcenas; who, as Velleius Paterculus ſays, "obſerving the raſh councils of the headſtrong youth with the ſame tranquillity and calmneſs as if nothing at all had been doing, inſtantly put him to death, without the leaſt noiſe and tumult; and by that means extinguiſhed another civil war in its very beginning."

The civil wars being now at an end, Auguſtus returned to Rome; and from this time Mæcenas indulged himſelf at vacant hours in literary amuſements, and the converſation of men of letters. In the year 734 Virgil died, and left Auguſtus and Mæcenas heirs to what he had. Mæcenas was exceſſively fond of this poet, who, of all the wits of the Auguſtan age, ſtood higheſt in his eſteem; and if the Georgics and the Æneid be owing to the good taſte and encouragement of this patron, as there is ſome reaſon to think, poſterity cannot commemorate him with too much gratitude. Horace may be ranked next to Virgil in Mæcenas's good graces: we have already mentioned how and at what time their friendſhip commenced. Propertius alſo acknowledges Mæcenas for his favourer and protector, lib. ii. eleg. 7.

Nor muſt Varius be forgot, though we have nothing of his remaining; ſince we find him highly praiſed by both Virgil and Horace. He was a writer of tragedies; and Quintilian thinks he may be compared with any of the ancients. In a word, Mæcenas's houſe was a place of refuge and welcome to all the learned of his time; not only to Virgil, Horace, Propertius, and Varius, but to Fundarius, whom Horace extols as an admirable writer of comedies: to Fuſcus Ariſtius, a noble grammarian, and Horace's intimate friend: to Plotius Tucca, who aſſiſted Varius in correcting the Æneid after the death of Virgil; to Valgius, a poet and very learned man, who, as Pliny tells us, dedicated a book to Auguſtus, *De uſu Herbarum*; to Aſinius Pollio, an excellent tragic writer; and to ſeveral others, whom it would be tedious to mention. All theſe dedicated their works, or ſome part of them at leaſt, to Mæcenas, and celebrated his praiſes in them over and over: and we may obſerve farther, what Plutarch tells us, that even Auguſtus himſelf inſcribed his Commentaries to him and to Agrippa.

Mæcenas continued in Auguſtus's favour to the end of his life, but not uninterruptedly. Auguſtus had an intrigue with Mæcenas's wife: and though the miniſter bore this liberty of his maſter very patiently, yet there was a coldneſs on the part of Auguſtus, which, however, ſoon went off. Mæcenas died in the year 745; but at what age we cannot preciſely determine, though we know he muſt have been old. He muſt have been older than Auguſtus, becauſe he was a kind of tutor to him in his youth: and then find him often called *an old man* by Pædo Albinovanus, a cotemporary poet, whoſe elegy upon his dead patron is ſtill extant. He made Auguſtus his heir; and recommended his friend Horace to him in thoſe memorable laſt words, "*Horatii Flacci, ut mei, memor eſto*," &c. Horace, however, did not probably ſurvive him long, as there is no elegy of his upon Mæcenas extant, nor any account of one having ever been written, which there certainly would have been had Horace ſurvived him any time. Nay, Father Sanadon, the French editor of Horace, will have it, that the poet died before his patron; and that theſe laſt words were found only in Mæcenas's will, which had not been altered.

Mæcenas is ſaid never to have enjoyed a good ſtate of health in any part of his life: and many ſingularities are related of his bodily conſtitution. Thus Pliny tells us, that he was always in a fever; and that, for three years before his death, he had not a moment's ſleep. Though he was certainly an extraordinary man, and poſſeſſed many admirable virtues and qualities, yet it is agreed on all hands, that he was very luxurious and effeminate. "Mæcenas (ſays Velleius Paterculus) was of the equeſtrian order, but ſprung from a moſt illuſtrious origin. He was a man, who, when buſineſs required, was able to undergo any fatigue and watching; who conſulted properly upon all occaſions, and knew as well how to execute what he had conſulted; yet a man who in ſeaſons of leiſure was luxurious, ſoft, and effeminate, almoſt beyond a woman. He was no leſs dear to Cæſar than Agrippa, but diſtinguiſhed by him with fewer honours; for he always continued of the equeſtrian rank, in which he was born: not that he could not have been advanced upon the leaſt intimation, but he never ſolicited it."

But let moraliſts and politicians determine of Mæcenas [illegible] as they pleaſe, the men of letters are under high obligations to celebrate his praiſes and revere his memory: for he countenanced, protected, and ſupported, as far as they wanted his ſupport, all the wits and learned men of his time; and that, too, out of a pure and diſintereſted love of letters, when he had no little views of policy to ſerve by their means: whence it is no wonder, that all the protectors and patrons of learning, ever ſince, have uſually been called *Mæcenas's*.

MAELSTROM, a very dangerous whirlpool on the coaſt of Norway, in the 68th degree of latitude, in the province of Nordland, and the diſtrict of Lofoden, and near the iſland of Moſkoe, from whence it alſo takes the name of *Moſkoe ſtrom*. Its violence and roarings exceed that of a cataract, being heard to a great diſtance, and without any intermiſſion, except a quarter every ſixth hour, that is, at the turn of high and low water, when its impetuoſity ſeems at a ſtand, which ſhort interval is the only time the fiſhermen can venture in; but this motion ſoon returns, and, however calm the ſea may be, gradually increaſes with ſuch a draught and vortex, as abſorb whatever comes within their ſphere of action, and keep it under water for ſome hours, when the fragments, ſhivered by the rocks, appear again. This circumſtance, among others, makes ſtrongly againſt Kircher and others, who imagine that there is here an abyſs penetrating the globe, and iſſuing in ſome very remote parts, which Kircher is ſo particular as to aſſign, for he names the gulf of Bothnia. But after the moſt exact reſearches which the circumſtances will admit, this is but a conjecture without foundation; for this and three other vortices among the Ferroe iſlands, but ſmaller, have no other cauſe than the colliſion of waves riſing and falling, at the flux and reflux, againſt a ridge of rocks and ſhelves, which confine the water ſo that it precipitates itſelf like a cataract; and thus the higher the flood riſes, the deeper muſt the fall be; and the natural reſult of this is a whirlpool or vortex, the prodigious ſuction whereof is ſufficiently known by leſſer experiments. But what has been thus abſorbed, remains no longer at the bottom than the ebb laſts; for the ſuction then ceaſes, and the flood removes all attraction, and permits whatever had been ſunk to make its appearance again. Of the ſituation of this amazing Moſkoe-ſtrom we have the following account from Mr Jonas Ramus: "The mountain of Helſeggen, in Lofoden, lies a league from the iſland Ver, and betwixt theſe two runs that large and dreadful ſtream called *Moſkoe-ſtrom*, from the iſland Moſkoe, which is in the middle of it, together with ſeveral circumjacent iſles, as Ambaaren, half a quarter of a league northward, Iſleſen, Hoeholm, Kieldholm, Suarven, and Buckholm. Moſkoe lies about half a quarter of a mile ſouth of the iſland of Ver, and betwixt them theſe ſmall iſlands, Otterholm, Flimen, Sanſleſen, Stockholm. Betwixt Lofoden and Moſkoe, the depth of the water is between 36 and 40 fathoms; but on the other ſide, towards Ver, the depth decreaſes, ſo as not to afford a convenient paſſage for a veſſel, without the riſk of ſplitting on the rocks, which happens even in the calmeſt weather: when it is flood, the ſtream runs up the country between Lofoden and Moſkoe with a boiſterous rapidity: but the roar of its impetuous ebb on the ſea is ſcarcely equalled by the loudeſt and moſt dreadful cataracts; the noiſe being heard ſeveral leagues off, and the vortices or pits are of ſuch an extent and depth, that if a ſhip comes within its attraction, it is inevitably abſorbed and carried down to the bottom, and there beat to pieces againſt the rocks; and when the water relaxes, the fragments thereof are thrown up again. But theſe intervals of tranquillity are only at the turn of the ebb and flood, and calm weather: and laſt but a quarter of an hour, its violence gradually returning. When the ſtream is moſt boiſterous, and its fury heightened by a ſtorm, it is dangerous to come within a Norway mile of it: boats, ſhips, and yachts having been carried away, by not guarding againſt it before they were within its reach. It likewiſe happens frequently, that whales come too near the ſtream, and are overpowered by its violence; and then it is impoſſible to deſcribe their howlings and bellowings in their fruitleſs ſtruggles to diſengage themſelves. A bear once attempting to ſwim from Lofoden to Moſkoe, with a deſign of preying upon the ſheep at paſture in the iſland, afforded the like ſpectacle to the people; the ſtream caught him, and bore him down, whilſt he roared terribly, ſo as to be heard on ſhore. Large ſtocks of firs and pine trees, after being abſorbed by the current, riſe again, broken and torn to ſuch a degree as if briſtles grew on them. This plainly ſhows the bottom to conſiſt of craggy rocks, among which they are whirled to and fro. This ſtream is regulated by the flux and reflux of the ſea; it being conſtantly high and low water every ſix hours. In the year 1645, early in the morning of Sexageſima Sunday, it raged with ſuch noiſe and impetuoſity, that on the iſland of Moſkoe, the very ſtones of the houſes fell to the ground."

MÆMACTERIA, ſacrifices offered to Jupiter at Athens in the winter month Mæmacterion. The god ſurnamed Mæmactes was entreated to ſend mild and temperate weather, as he preſided over the ſeaſons, and was the god of the air.

MÆMACTERION, was the fourth month of the Athenian year, containing twenty-nine days, and anſwering to the latter part of our September, and the beginning of October. It received its name from the feſtival *Mæmacteria*, which was obſerved about this time. This month was called by the Bœotians *Alalcomenius*.

MÆNA. See Sparus, Ichthyology *Index*.

MÆNALUS, in *Ancient Geography*, a mountain of Arcadia ſacred to the god Pan, and greatly frequented by ſhepherds. It received its name from Mænalus a ſon of Lycaon. It was covered with pine trees, whoſe echo and ſhade have been greatly celebrated by all the ancient poets.

MÆONIA, or Moeonia, a country of Aſia Minor, and forming part of Lydia; namely the neighbourhood of Mount Tmolus, and the country watered by the Pactolus. The reſt on the ſea coaſt was called Lydia. See Lydia.

MÆONIDÆ, a name given to the muſes, becauſe Homer, their greateſt and worthieſt favourite, was ſuppoſed to be a native of Mæonia.

MÆONIDES, a ſurname of Homer, becauſe, according to the opinion of ſome writers, he was born in Mæonia, or becauſe his father's name was Mæon.

MÆOTIS palus or lacus, *Mæotica Palus*, or *Mæoticus Lacus*, in *Ancient Geography*, a large lake or part of the ſea between Europe and Aſia, at the north of the Euxine, to which it communicates by the Cimmerian Boſphorus. It was worſhipped as a deity by the Maſſagetæ. It extends about 390 miles from ſouth-weſt to north-eaſt, and is about 600 miles in circumference. Still called *Palus Mæotis*, reaching from Crim Tartary to the mouth of the Don.

MÆSTLIN, Michael, in Latin *Mæſtlinus*, a celebrated aſtronomer of Germany, was born in the duchy of Wirtemberg; but ſpent his youth in Italy, where he made a ſpeech in favour of Copernicus's ſyſtem, which brought Galilæo over from Ariſtotle and Ptolemy, to whom he had been hitherto entirely devoted. He afterwards returned to Germany, and became profeſſor of mathematics at Tubingen; where, among his other ſcholars, he taught the great Kepler, who has praiſed ſeveral of his ingenious inventions in his *Aſtronomia Optica*. Though Tycho Brahé did not aſſent to Mæſtlin's opinion, yet he allowed him to be an extraordinary perſon, deeply ſkilled in the ſcience of aſtronomy. Mæſtlin publiſhed many mathematical and aſtronomical works; and died in 1590.

MAESTRICHT, an ancient, large, and ſtrong town of the Netherlands, ceded to the Dutch by the treaty of Munſter. The townhouſe and the other public buildings are handſome, and the place is about four miles in circumference, and ſtrongly fortified. It is governed jointly by the Dutch and the biſhop of Liege; however, it has a Dutch garriſon. The inhabitants are noted for making excellent fire arms, and ſome ſay that in the arſenal there are arms ſufficient for a whole army. Both Papiſts and Proteſtants are allowed the free exerciſe of their religion, and the magiſtrates are compoſed of both. It is ſeated on the river Maeſe, which ſeparates it from Wyck, and with which it communicates by a handſome bridge. Maeſtricht revolted from the Spaniards in 1570, but was reduced in 1579. Louis XIV. became maſter of it in 1673; but it was reſtored to the ſtates by the treaty of Nimeguen in 1678. It was again taken by the French in 1794. E. Long. 5. 50. N. Lat. 51. 5.

MAFFÆUS, Vegio, a Latin poet, born in Lombardy in 1407, was greatly admired in his time. He wrote epigrams, and a humorous ſupplement to Virgil, which he called *The thirteenth book of the Æneid*: this was as humorouſly tranſlated into Engliſh a few years ſince by Mr Ellis. Maffæus wrote alſo ſome proſe works. He was chancellor of Rome towards the end of the pontificate of Martin V.; and died in 1458.

MAFFEI, Scipio, a celebrated Italian poet, born of an illuſtrious and ancient family at Verona, in 1675. After having finiſhed his ſtudies, he took arms, and diſtinguiſhed himſelf by his valour at the battle of Donawert; but he more particularly diſtinguiſhed himſelf by his love of learning, which made him undertake ſeveral voyages into France, England, and Germany. He converſed with the learned in all thoſe countries, and obtained their friendſhip and eſteem. He was a member of the academy of the Arcadia at Rome, an honorary foreign member of that of Inſcriptions at Paris; and died in 1755. He wrote many works in verſe and proſe, which are eſteemed; the moſt known of which are, 1. The tragedy of Merope, of which there are two French tranſlations in proſe. 2. Ceremony, a comedy. 3. A tranſlation, into Italian verſe, of the firſt book of Homer's Iliad. 4. Many other pieces of poetry, in a collection entitled *Rhyme and Proſe*, quarto. His principal works in proſe are, 1. *Verona illuſtrata*. 2. *Iſtoria diplomatica*. 3. *Scienza cavalereſca*; an excellent work, in which he attacks duelling. 4. An edition of *Teatro Italiano*. 5. An edition of Caſſiodorus on the Epiſtles, Acts of the Apoſtles, and Apocalypſe. 6 *Galliæ Antiquitates quædam ſelectæ atque in plures epiſtolas diſtributæ*; and ſeveral other works.

MAGADA, in *Mythology*, a title under which Venus was known and worſhipped in Lower Saxony; where this goddeſs had a famous temple, which was treated with reſpect even by the Huns and Vandals when they ravaged the country. It is ſaid to have been deſtroyed by Charlemagne.

MAGADOXO, the capital town of a kingdom of the ſame name, in Africa, and on the coaſt of Ajan. It is ſeated near the mouth of a river of the ſame name, defended by a citadel, and has a good harbour. The inhabitants are Mahometans. E. Long. 45. 15. N. Lat. 3. 0.

MAGAS, MAGADIS, (from μαγαδίζειν, "to ſing or play in uniſon or octave,") the name of a muſical inſtrument in uſe among the ancients."

There were two kinds of *magades*, the one a ſtring inſtrument, formed of 20 chords arranged in pairs, and tuned to uniſon or octave, ſo that they yielded ten ſounds; the invention whereof is aſcribed by ſome to Sappho; by others, to the Lydians; and by ſome, to Timotheus of Miletus. The other was a kind of flute, which at the ſame time yielded very high and very low notes. The former kind was at leaſt much improved by Timotheus of Miletus, who is ſaid to have been impeached of a crime, becauſe by increaſing the number of chords he ſpoiled and diſcredited the ancient muſic.

MAGAZINE, a place in which ſtores are kept, of arms, ammunition, proviſions, &c. Every fortified town ought to be furniſhed with a large magazine, which ſhould contain ſtores of all kinds, ſufficient to enable the garriſon and inhabitants to hold out a long ſiege; and in which ſmiths, carpenters, wheelwrights, &c. may be employed in making every thing belonging to the artillery; as carriages, waggons, &c.

Powder MAGAZINE, is that place where the powder is kept in very large quantities. Authors differ greatly both with regard to their ſituation and conſtruction; but all agree that they ought to be arched and bombproof. In fortifications, they are frequently placed in the rampart; but of late they have been built in different parts of the town. The firſt powder magazines were made with Gothic arches: but M. Vauban finding them too weak, conſtructed them in a ſemicircular form; whoſe dimenſions are 60 feet long within, and 25 broad; the foundations are eight or nine feet thick, and eight feet high from the foundation to the ſpring of the arch; the floor is two feet from the ground, which keeps it from dampneſs.

One of our engineers of great experience ſome time ſince had obſerved, that after the centres of ſemicircular arches are ſtruck, they ſettle at thec rown and riſe up at the haunches, even with a ſtraight horizontal extrados, and ſtill much more ſo in powder magazines, whoſe outſide at top is formed like the roof of a houſe, by two inclined planes joining in an angle over the top of the arch, to give a proper deſcent to the rain; which effects are exactly what might be expected agreeably to the true theory of arches. Now, as this unequal ſettling of the arches muſt be attended with very ill conſequences, by breaking the texture of the cement after it has been in ſome degree dried, and alſo by opening the joints of the vouſſoirs at one end, ſo a remedy is provided for this inconvenience, by ſubſtituting the *arch of equilibration* in Dr Hutton's book on bridges; but as the ill effect is much greater in powder magazines, the ſame ingenious gentleman has propoſed to find an arch of equilibration for them alſo, and to conſtruct it when the ſpan is 20 feet, the pitch or height 10 (which are the ſame dimenſions as the ſemicircle), the inclined exterior walls at top forming an angle of 113 degrees, and the height of their angular point above the top of the arch equal to ſeven feet. This very curious queſtion was anſwered in 1775 by the reverend Mr Wildbore, to be found in Mr Hutton's *Miſcellanea Mathematica*.

Artillery MAGAZINE. In a ſiege, the magazine is made about 25 or 30 yards behind the battery, towards the parallels, and at leaſt three feet under ground, to hold the powder, loaded ſhells, portfires, &c. Its ſides and roof muſt be well ſecured with boards to prevent the earth from falling in: a door is made to it, and a double trench or paſſage is ſunk from the magazine to the battery, one to go in and the other to come out at, to prevent confuſion. Sometimes traverſes are made in the paſſages to prevent ricochet ſhot from plunging into them.

MAGAZINE, on ſhipboard, a cloſe room or ſtorehouſe, built in the fore or after-part of the hold, to contain the gunpowder uſed in battle. This apartment is ſtrongly ſecured againſt fire, and no perſon is allowed to enter it with a lamp or candle: it is therefore lighted, as occaſion requires, by means of the candles or lamps in the *light room* contiguous to it.

MAGAZINE *Air-Gun*. See AIR *Gun*.

MAGAZINES, *Literary*; a well known ſpecies of periodical publications, of which the firſt that appeared was *The Gentleman's*, ſet on foot by the projector Mr Edward Cave in the year 1731: (ſee the article CAVE). This, as Dr Kippis obſerves *, "may be conſidered as ſomething of an epocha in the literary hiſtory of this country. The periodical performances before that time were almoſt wholly confined to political tranſactions, and to foreign and domeſtic occurrences: but the monthly magazines have opened a way for every kind of inquiry and information. The intelligence and diſcuſſion contained in them are very extenſive and various: and they have been the means of diffuſing a general habit of reading through the nation, which in a certain degree hath enlarged the public underſtanding. Many young authors, who have afterwards riſen to conſiderable eminence in the literary world, have here made their firſt attempts in compoſition. Here too are preſerved a multitude of curious and uſeful hints, obſervations, and facts, which otherwiſe might never have appeared; or if they had appeared in a more evaneſcent form, would have incurred the danger of being loſt.

* Biog. Brit. Article Cave.

it were not an invidious talk, the hiſtory of them would be no incurious or unentertaining ſubject. The magazines that unite utility with entertainment, are undoubtedly preferable to thoſe (*if there have been any ſuch*) which have only a view to idle and frivolous amuſement. It may be obſerved, that two of them, *The Gentleman's* and *The London*, which laſt was begun the year after the former, have amidſt their numerous rivals preſerved their reputation to the preſent day. They have both of them, in general, joined inſtruction with pleaſure; and this likewiſe hath been the caſe with ſome others of a latter origin."—The original London Magazine, it is believed, has been diſcontinued for ſome years paſt.—The next oldeſt publication of this kind is that entitled *The Scots Magazine*; which was commenced at Edinburgh a few years poſterior to the appearance of the *Gentleman's* at London; which, like it, has ſurvived many rivals; and which ſtill ſubſiſts, deſervedly eſteemed for the chaſteneſs of its plan and the accuracy of its information.

MAGDALEN, Mary. See Mary.

Religious of St Magdalen, a denomination given to divers communities of nuns, conſiſting generally of penitent courtezans; ſometimes alſo called *Magdalenettes*. Such are thoſe at Metz, eſtabliſhed in 1452; thoſe at Paris, in 1492; thoſe at Naples, firſt eſtabliſhed in 1324, and endowed by Queen Sancha, to ſerve as a retreat for public courtezans, who ſhould betake themſelves to repentance; and thoſe of Rouen and Bourdeaux, which had their original among thoſe of Paris in 1618. In each of theſe monaſteries there are three kinds of perſons and congregations; the firſt conſiſt of thoſe who are admitted to make vows, and theſe bear the name of *St Magdalen*; the congregation of St Martha is the ſecond, and is compoſed of thoſe whom it is not judged proper to admit to vows; finally, the congregation of St Lazarus is compoſed of ſuch as are detained there by force.

The religious of St Magdalen at Rome were eſtabliſhed by Pope Leo X. Clement VIII. ſettled a revenue on them; and farther appointed, that the effects of all public proſtitutes, dying inteſtate, ſhould fall to them; and that the teſtaments of the reſt ſhould be invalid unleſs they bequeathed a portion of their effects, which was to be at leaſt a fifth part, to them.

Magdalen Hoſpital. See London, N° 115.

MAGDALENA, one of the Marqueſas iſlands, about five leagues in circuit, and ſuppoſed to be in S. Lat. 10. 25. W. Long. 138. 50. It was only ſeen at nine leagues diſtance by thoſe who diſcovered it.

MAGDALENE's Cave, a cave of Germany, and in Carinthia, 10 miles eaſt of Gortz. It appears like a chaſm in a rock, and at the entrance torches are lighted to conduct travellers. It is divided into ſeveral apartments, or halls, with a vaſt number of pillars formed by nature, which give it a beautiful appearance, they being as white as ſnow, and almoſt tranſparent. The bottom is of the ſame ſubſtance, inſomuch that a perſon may fancy himſelf to be walking among the ruins of an enchanted caſtle, ſurrounded with magnificent pillars, ſome entire and others broken.

MAGDEBURG, a duchy of Germany, in the circle of Lower Saxony; bounded on the north by the duchy of Mecklenburgh, on the ſouth and ſouthweſt by the principality of Anhalt and Halberſtadt, on the eaſt by Upper Saxony with part of Brandenburg, and on the weſt by the duchy of Wolfenbuttle. The Saale circle, and that of Luxkenwalde, are ſeparated from the reſt, and ſurrounded on all ſides by a part of Upper Saxony. This country is for the moſt part level; but ſandy, marſhy, or overgrown with woods. There are ſalt ſprings in it ſo rich, that they are ſufficient to ſupply all Germany with that commodity. The Holz circle is the moſt fruitful part of it. In the Saale circle, where wood is ſcarce, there is pit-coal: and at Rothenburg is a copper-mine worked. The duchy is well watered, for the Elbe paſſes through it; and the Saale, Havel, Aller, Ohre, and Elſter, either riſe in, or waſh ſome part of it in their courſe. The whole duchy, excluſive of that part of the county of Mansfeldt which is connected with it, is ſaid to contain 29 cities, ſix towns, about 430 villages, and 330,000 inhabitants. The ſtates of the country conſiſt of the clergy, the nobility, and deputies of the cities. Before it became ſubject to the electoral houſe of Brandenburgh, frequent diets were held in it; but at preſent no diets are held, nor have the ſtates the direction of the finances as formerly. Before the Reformation, it was an archbiſhopric, ſubject in ſpirituals to the pope alone, and its prelate was primate of all Germany; but embracing the Reformation, it choſe itſelf adminiſtrators, till the treaty of Munſter in 1648, when it was given, together with the biſhopric of Halberſtadt, to the elector of Brandenburgh, as an equivalent for the Hither Pomerania, granted by that treaty to the king of Sweden. Lutheraniſm is the predominant religion here; but Calviniſts, Jews, and Roman Catholics, are tolerated. Of the laſt there are five convents, who never embraced the Reformation. All the Lutheran pariſhes, amounting to 314, are ſubject to 16 inſpectors, under one general ſuperintendant; only the clergy of the old town of Magdeburg are under the direction of their ſenior. The Jews have a ſynagogue at Halle. The manufactures of the duchy are cloth, ſtuffs, ſtockings, linen, oilſkins, leather, and parchment; of which, and grain of all ſorts, large quantities are exported. The arms of it are, Party per pale, ruby, and pearl. The king of Pruſſia, as duke of Magdeburg, ſits and votes between the elector of Bavaria, as duke of Bavaria, and the elector palatine, as palſgrave of Lautern. Of the ſtates of the circle of Lower Saxony he is the firſt. His matricular aſſeſſment for the duchy is 43 horſe and 196 foot, or 1300 florins monthly; and to the chamber of Wetzlar 343 florins and 40 kruitzers. For the civil government of the duchy there is a council of regency, with a war and demeſne chamber; and for the eccleſiaſtical a conſiſtory and general ſuperintendant. The revenues of the duchy, ariſing from the ſalt-works, demeſne, and taxes, ſome of which are very heavy and oppreſſive, are ſaid to amount to 800,000 rixdollars annually. With reſpect to ſalt, every houſekeeper in the Pruſſian dominion is obliged to buy a certain quantity for himſelf and wife; and alſo for every child and ſervant, horſe, cow, calf, and ſheep, that he poſſeſſes. The principal places are Magdeburg, Halle, and Glauche.

Magdeburg, a city of Germany, in a duchy of the ſame name, of which it is not only the capital, but that of all Lower Saxony, and formerly even of all Germany. It ſtands on the Elbe, in E. Long. 12. 9. N. Lat. 52. 16. It is a city of great trade, ſtrongly fortified, and very ancient. Its name ſignifies the *maiden city;* which, ſome imagine, took its riſe from the temple of Venus, which is ſaid to have ſtood here anciently, and to have been deſtroyed by Charlemagne. The founder of the city is ſuppoſed to have been Otho I. or his empreſs Editha, daughter to Edmund the Saxon king of England. The ſame emperor founded a Benedictine convent here, which he afterwards converted into an archbiſhopric, of which the archbiſhop was a count-palatine, and had very great privileges, particularly that of wearing the archiepiſcopal pallium, and having the croſs borne before him, beſides many others. The firſt tournament in Germany is ſaid to have been appointed near this city, by the emperor Henry the Fowler; but theſe paſtimes were afterwards aboliſhed, becauſe they occaſioned ſuch envy and animoſity among the nobility, that ſeveral of them killed one another upon the ſpot. The ſituation of the city is very convenient and pleaſant, upon the banks of the Elbe, amidſt ſpacious fruitful plains, and on the road betwixt High and Low Germany. It has been a great ſufferer by fires and ſieges; but by none ſo much as that in 1631 when the emperor's general, Count Tilly, took it by ſtorm, plundered and ſet it on fire, by which it was entirely reduced to aſhes, except the cathedral, the convent of our Lady, and a few cottages belonging to fiſhermen; of 40,000 burghers, not above 400 eſcaping. The ſoldiers ſpared neither age nor ſex; but ripped up women with child, murdered ſucking infants in ſight of their parents, and raviſhed young women in the ſtreets; to prevent which violation, many of them flung themſelves into the Elbe, and others into the fire. The city is now populous, large, and well built, particularly the broad ſtreet and cathedral ſquare. The principal buildings are the king's palace, the governor's houſe, the armoury, guildhall, and cathedral. The laſt is a ſuperb ſtructure in the antique taſte, dedicated to St Maurice, which has a fine organ, the maſter pipe of which is ſo big, that a man can ſcarce claſp it with both arms; it alſo contains the tombs of the emperor Otho and the empreſs Editha; a fine marble ſtatue of St Maurice, a porphyry font, an altar in the choir of one ſtone of divers colours, curiouſly wrought, and many other curioſities. They ſhow here a bedſtead and table which belonged to Martin Luther, when he was an Auguſtine friar in a cloiſter of this city before the Reformation. Among the relics, they pretended to have the baſon in which Pilate waſhed his hands after his condemnation of our Saviour; the lantern which Judas made uſe of when he apprehended him; and the ladder on which the cock crowed after St Peter denied him. The chapter conſiſts of a provoſt, ſixteen major and ſeven minor cánons; beſides which, there are four other Lutheran collegiate foundations, and a Lutheran convent dedicated to our Lady, in which is a ſchool or ſeminary. Here is alſo a gymnaſium, with an academy, in which young gentlemen are inſtructed in the art of war. The canons of the chapter, which, except the change of religion, is upon the ſame footing as before the Reformation, muſt make proof of their nobility. The prebends and dignities are all in the gift of the elector; and the revenue of the provoſt is computed at 12,000 crowns a-year. Here is a great trade, and a variety of manufactures. The chief are thoſe of woollen cloths and ſtuffs, ſilks, cottons, linen, ſtockings, hats, gloves, tobacco and ſnuff. The city was formerly one of the Hanſe and Imperial towns. Editha, conſort to Otho I. on whom it was conferred as a dowry, among many other privileges and advantages, procured it the grant of a yearly fair. The burgravate of this city was anciently an office of great power; having the civil and criminal juriſdiction, the office of hereditary cupbearer being annexed to it; and was long held as a fief of the archbiſhopric, but afterwards became an imperial fief, which was again conferred on the archbiſhopric by the elector of Saxony, upon certain conditions.

MAGDOLUM, or MAGDALUM, in *Ancient Geography*, a town of the Lower Egypt, twelve miles to the ſouth of Peluſium (Herodotus, Antonine), which doubtleſs is the Migdol or Magdol of Jeremiah.—Another MAGDALUM, or MIGDOL, denoting literally "a tower or place of ſtrength," near the Red ſea, (Moſes); far to the ſouth of the former.

MAGELLAN, FERDINAND DE, an eminent navigator, was by birth a Portugueſe, of a good family. He ſerved in the Eaſt Indies with reputation for five years under Albuquerque, and in 1510 he greatly diſtinguiſhed himſelf at the battle of Malacca. Deeming his ſervices poorly repaid by his own court, he entered into the employment of Charles V. king of Spain. He has been charged with peculation by ſome of his countrymen, who have aſſigned this as the reaſon why he quitted Portugal. In conjunction with Ruy Falero he formed the bold deſign of diſcovering a new paſſage by the weſt to the Molucca iſlands, which he offered to prove fell within the diviſion of the globe aſſigned by the pope to the crown of Caſtile. It is ſaid that he firſt propoſed this enterprize to Emanuel king of Portugal, who rejected it, as opening a way for other nations to have acceſs to the Eaſt Indies, the trade of which was now monopolized by the Portugueſe. The propoſition was agreed to by the king of Spain, and on the 20th of September 1519 Magellan failed from San Lucar with five ſhips and 236 men under his command. His officers ſoon murmured at this appointment, conſidering it as a diſgrace to be commanded by a renegade Portugueſe; and when the fleet was lying at a port in South America which they named San Julian, a conſpiracy was formed againſt him by three of the captains, which he diſcovered and quelled. He cauſed the captain of one of the ſhips to be aſſaſſinated, he boarded a ſecond, and ſecured the mutineers, and the third ſubmitted.

The coaſt on which they lay was that of Patagonia, and this firſt voyage contains accounts of the extraordinary ſtature of the natives. About the end of October they reached a cape, [illegible] Dee las Virgines, forming the entrance of the ſtraits which bear the name of Magellan. He exerted all his authority to induce his men to venture on this unknown paſſage, with the view of [illegible] it, at the hazard of running ſhort of proviſions, of which [illegible] One of [illegible] her way to Europe. He ſtill proceeded, [illegible] the

27th of November they diſcovered the South ſea, which made Magellan ſhed tears of joy. They continued their voyage over this ocean, now viſited for the firſt time by Europeans, and were not long in ſuffering thoſe evils from famine which they had apprehended. The men were reduced to the neceſſity of eating the hides with which the rigging was covered. The weather proved ſo uniformly calm and temperate, that they gave to the ocean the name of *Pacific*. They came in ſight of the Ladrones on the 6th of March, ſo called from the thieviſh diſpoſition of the inhabitants; and from thence they ſailed to the Philippines. At Zebu Magellan obtained with little difficulty the converſion of the king; and on condition of his becoming a vaſſal of Spain, the Portugueſe aſſiſted him in reducing ſome neighbouring chieftains, and the croſs was erected over ſome burnt villages.

With about 50 men Magellan landed upon Matan, whoſe chief refuſed to ſubmit to Zebu, and an engagement between them laſted for the greater part of the day. His troops having ſpent all their ammunition, found it neceſſary to retreat, during which Magellan was wounded in the leg by an arrow, beaten down, and at laſt ſlain with a lance. This happened in 1521. By this act of imprudence he loſt the honour of being the firſt circumnavigator of the globe, which fell to the lot of Cano, who brought his ſhip home by the Eaſt Indies. Yet Magellan has ſecured an immortal name among maritime diſcoverers, by the commencement of this great enterprize, in which he diſplayed extraordinary ſkill and reſolution, but diſregarded juſtice and humanity, then almoſt univerſal among adventurers of this claſs.

Straits of MAGELLAN, a narrow paſſage between the iſland of Terra del Fuego and the ſouthern extremity of the continent of America. This paſſage was firſt diſcovered by Ferdinand Magellan, who ſailed through it into the South ſea, and from thence to the Eaſt Indies. Other navigators have paſſed the ſame way; but as theſe ſtraits are exceedingly difficult, and ſubject to ſtorms, it has been common to ſail by Cape Horn, rather than through the ſtraits of Magellan. See *Straits Le MAIRE*, and *TERRA del Fuego*.

MAGELLANIC CLOUDS, whitiſh appearances like clouds, ſeen in the heavens towards the ſouth pole, and having the ſame apparent motion as the ſtars. They are three in number, two of them near each other. The largeſt lies far from the ſouth pole; but the other two are not many degrees more remote from it than the neareſt conſpicuous ſtar, that is, about 11 degrees. Mr Boyle conjectures, that if theſe clouds were ſeen through a good teleſcope, they would appear to be multitudes of ſmall ſtars, like the milky-way.

MAGGI, JEROME, in Latin *Magius*, one of the moſt learned men of the 16th century, was born at Anghiari in Tuſcany. He applied himſelf to all the ſciences, and even to the art of war; and diſtinguiſhed himſelf ſo much in this laſt ſtudy, that the Venetians ſent him into the iſland of Cyprus in quality of judge of the admiralty. When the Turks beſieged Famaguſta, he performed all the ſervices that could be expected from the moſt excellent engineer: he invented mines and machines for throwing fire, by means of which he deſtroyed all the works of the beſiegers, and in an inſtant overthrew what had coſt the Turks infinite labour. But they had their revenge; for, taking the city in 1571, they plundered his library, carried him loaded with chains to Conſtantinople, and treated him in the moſt inhuman and barbarous manner. He nevertheleſs comforted himſelf from the example of Æſop, Menippus, Epictetus, and other learned men; and, after paſſing the whole day in the meaneſt drudgery, he ſpent the night in writing. He compoſed, by the help of his memory alone, treatiſes filled with quotations, which he dedicated to the Imperial and French ambaſſadors. Theſe miniſters, moved by compaſſion for this learned man, reſolved to purchaſe him; but while they were treating for his ranſom, Maggi found means to make his eſcape, and to get to the Imperial ambaſſador's houſe; when the grand viſir being enraged at his flight, and remembering the great miſchief he had done the Turks during the ſiege of Famaguſta, ſent to have him ſeized, and cauſed him to be ſtrangled in priſon in 1572. His principal works are, 1. A Treatiſe on the Bells of the Ancients. 2. On the Deſtruction of the World by Fire. 3. Commentaries on Æmilius Probus's Lives of Illuſtrious Men. 4. Commentaries on the Inſtitutes. Theſe works are written in elegant Latin. He alſo wrote a treatiſe on fortification in Italian; and a book on the ſituation of ancient Tuſcany.

He ought not to be confounded with his brother *Bartholomew Maggi*, a phyſician at Bologna, who wrote a treatiſe of gunſhot wounds: nor with *Vincent Maggi*, a native of Breſſe, and a celebrated profeſſor of humanity at Ferrara in Padua, who was the author of ſeveral works.

MAGGOT, the common name of the fly-worm bred in fleſh, from the egg of the great blue fleſh fly. Notwithſtanding the diſtaſte for this animal, its figure and ſtructure of parts are greatly worth attending to; and may ſerve as a general hiſtory of the claſs of worms produced from the eggs of flies.

This animal is white and fleſhy; its body is compoſed of a number of rings, like the bodies of caterpillars and other ſimilar inſects; and is capable, at the pleaſure of the animal, of aſſuming different figures; being at times more or leſs extended in length, and conſequently more or leſs thick.

Notwithſtanding that this animal has no legs, it is able to move itſelf very ſwiftly; and in its firſt attempt to move its body, is extended to its greateſt length, and aſſumes ſomething of the figure of a pointed cone. The pointed part of the cone is the head of the animal, and is not ſeparated from the next ring by any deeper furrow than the reſt of the rings are from one another. In ſome ſtates of the animal, one may ſee two ſhort horns thruſt out from the head; but more generally two ſcaly hooks are obſervable: theſe are, however, ſometimes hid, and have each of them a caſe or ſheath; into which the animal can retract them at pleaſure. Theſe hooks are bent into an arch, the concavity of which is towards the plane on which the creature is placed; and they are thickeſt at their inſertion in the head, and thence diminiſh gradually, till they terminate in a fine ſharp point.

Theſe two hooks are placed in a parallel direction, and can never come together, and therefore cannot ſerve in the place of teeth for grinding the food; but merely to pull and ſever it in pieces, that it may be of a proper ſize for the mouth of the creature. Beſides theſe hooks the maggot has a kind of dart, which is about a third part of their length, and is placed at an equal diſtance between them. This alſo is brown and ſcaly like them; it is quite ſtraight, and terminates in a fine point. The hooks have as it were two ſcaly thorns at their points; and this dart ſeems intended, by reiterated ſtrokes to divide, and break the pieces of fleſh theſe have ſeparated from the reſt into ſmaller parts. Immediately below the apertures for the egreſs of the hooks, is placed the mouth of the animal; the creature does not ſhow this little opening unleſs preſſed: but if the preſſure is properly managed it will ſufficiently open it, and there may be diſcovered within it a ſmall protuberance, which may very naturally be ſuppoſed either the tongue or the ſucker of the animal. The hooks in theſe creatures not only ſupply the place of teeth, but alſo of legs; ſince it is by faſtening theſe hooks into the ſubſtance it is placed on, and then drawing up its body to it, that it pulls itſelf along.

The back of this creature lowers itſelf by degrees as it approaches the extremity of the belly; and near the place where the back begins to lower itſelf, are placed the creature's two principal organs of reſpiration. One may perceive there are two ſmall roundiſh brown ſpots: they are very eaſily diſtinguiſhable by the naked eye, becauſe the reſt of the body of the creature is white; but if we take in the aſſiſtance of glaſſes, each of theſe ſpots appears to be a brown circular eminence raiſed a little above the reſt of the body. On each of theſe ſpots one may alſo diſcover three oblong oval cavities, ſomething of the ſhape of button holes; theſe are ſituated in a parallel direction to one another, and their length nearly in a perpendicular direction to that of the body of the animal. Theſe apertures are ſo many ſtigmata or air-holes; openings deſtined to admit the air neceſſary to the life of the animal. It has ſix of theſe ſtigmata, three in each ſide of its body.

The great tranſparency of the body of this animal gives us an opportunity alſo to diſtinguiſh that it has on each ſide a large white veſſel running the whole length of the body. It is eaſy to follow the courſe of theſe veſſels through their whole length, but they are moſt diſtinct of all towards its hinder part; and they are always ſeen to terminate each in the brown ſpot above mentioned; this leaves us no room to doubt that they are the two principal tracheæ.

The ramifications of the two great tracheæ are very beautifully ſeen in this creature, eſpecially on its belly; and it is remarkable, that no veſſel analogous to the great artery in the caterpillar claſs can be diſcovered in theſe; though, if there were any ſuch, their great tranſparence muſt needs make them very eaſily diſtinguiſhable; nor could its dilatations and contractions, if ſo conſiderable as in that claſs of animals, be leſs ſo. See CATERPILLAR, ENTOMOLOGY *Index*.

Malpighi imagined, that this artery in the caterpillar claſs was a ſeries of hearts; in its place, however, there may be ſeen in theſe animals a true heart. It is eaſy to obſerve in theſe creatures, about the fourth ring of their body, a ſmall fleſhy part, which has alternate contractions and dilatations; and is not only diſcoverable in the body by means of its tranſparence, but on making a proper ſection of them in the ſecond, third, and fourth, will be thrown out of the body of the creature, and continue its beats for ſome time afterwards.

MAGI, or **MAGIANS**, an ancient religious ſect in Perſia, and other eaſtern countries, who maintained that there were two principles, one the cauſe of all good, the other the cauſe of all evil: and, abominating the adoration of images, they worſhipped God only by fire; which they looked upon as the brighteſt and moſt glorious ſymbol of Oromaſdes, or the good god; as darkneſs is the trueſt ſymbol of Arimanius, or the evil god. This religion was reformed by Zoroaſter, who maintained that there was one ſupreme independent Being; and under him two principles or angels, one the angel of goodneſs and light, and the other of evil and darkneſs; that there is a perpetual ſtruggle between them, which ſhall laſt to the end of the world; that then the angel of darkneſs and his diſciples ſhall go into a world of their own, where they ſhall be puniſhed in everlaſting darkneſs; and the angel of light and his diſciples ſhall alſo go into a world of their own, where they ſhall be rewarded in everlaſting light.

The prieſts of the magi were the moſt ſkilful mathematicians and philoſophers of the ages in which they lived, inſomuch that a learned man and a magian became equivalent terms. The vulgar looked on their knowledge as ſupernatural; and hence thoſe who practiſed wicked and miſchievous arts, taking upon themſelves the name of *magians*, drew on it that ill ſignification which the word magician now bears among us.

This ſect ſtill ſubſiſts in Perſia under the denomination of *gaurs*, where they watch the ſacred fire with the greateſt care, and never ſuffer it to be extinguiſhed.

MAGIC, (**MAGIA**, Μαγεια), in its ancient ſenſe, the ſcience or diſcipline and doctrine of the magi, or wiſe men of Perſia. See MAGI.

The origin of magic and the magi is aſcribed to Zoroaſter. Salmaſius derives the very name from Zoroaſter, who, he ſays, was ſurnamed *Mog*, whence Magus. Others, inſtead of making him the author of the Perſian philoſophy, make him only the reſtorer and improver thereof; alleging, that many of the Perſian rites in uſe among the magi were borrowed from the Zabii among the Chaldeans, who agreed in many things with the magi of the Perſians; whence ſome make the name *magus* common both to the Chaldeans and Perſians. Thus Plutarch mentions, that Zoroaſter inſtituted magi among the Chaldeans, in imitation whereof the Perſians had theirs too.

MAGIC, in a more modern ſenſe, is a ſcience which teaches to perform wonderful and ſurpriſing effects.

The word *magic* originally carried with it a very innocent, nay, laudable meaning; being uſed purely to ſignify the ſtudy of wiſdom, and the more ſublime parts of knowledge; but in regard the ancient magi engaged themſelves in aſtrology, divination, ſorcery, &c. the term *magic* in time became odious, and was only uſed to ſignify an unlawful and diabolical kind of ſcience, depending on the aſſiſtance of the devil and departed ſouls.

If any wonder how ſo vain and deceitful a ſcience ſhould gain ſo much credit and authority over men's minds, Pliny gives the reaſon of it. It is, ſays he, becauſe it has gained hold of three ſciences of the moſt eſteemed among men; taking from each all that is great and marvellous in it. Nobody doubts but it had its firſt origin in medicine; and that it inſinuated itſelf into the minds of the people, under pretence of affording extraordinary remedies. To theſe fine promiſes it added every thing in religion that is pompous and ſplendid, and all that appears calculated to blind and captivate mankind. Laſtly, It mingled judicial aſtrology with the reſt; perſuading people, curious of futurity, that it ſaw every thing to come in the heavens. Agrippa divides magic into three kinds; natural, celeſtial, and ceremonial or ſuperſtitious.

Natural Magic is no more than the application of natural active cauſes to paſſive ſubjects; by means whereof many ſurpriſing, but yet natural, effects are produced.

In this way many of our experiments in natural philoſophy, eſpecially thoſe of electricity, optics, and magnetiſm, have a kind of magical appearance, and among the ignorant and credulous might eaſily paſs for miracles. Such, without doubt, have been ſome of thoſe miracles wrought by ancient magicians, whoſe knowledge of the various powers of nature, there is reaſon to believe, was much greater than modern vanity will ſometimes allow †.

Baptiſta Porta has a treatiſe of natural magic, or of ſecrets for performing very extraordinary things by natural cauſes. The natural magic of the Chaldeans was nothing but the knowledge of the powers of ſimples and minerals. The magic which they called *theurgia*, conſiſted wholly in the knowledge of the ceremonies to be obſerved in the worſhip of the gods, in order to be acceptable. By virtue of theſe ceremonies they believed they could converſe with ſpiritual beings, and cure diſeaſes.

Celeſtial Magic borders nearly on judiciary aſtrology: it attributes to ſpirits a kind of rule or dominion over the planets, and to planets a dominion over men; and on thoſe principles builds a ridiculous kind of ſyſtem. See ASTROLOGY.

Sorcery, or Goetic Magic conſiſts in the invocation of devils. Its effects are uſually evil and wicked, though very ſtrange, and ſeemingly ſurpaſſing the powers of nature; ſuppoſed to be produced by virtue of ſome compact, either tacit or expreſs, with evil ſpirits: but the truth is, theſe have not all the power that is uſually imagined, nor do they produce thoſe effects ordinarily aſcribed to them.

This ſpecies of magic, there is every reaſon to believe, had its origin in Egypt, the native country of paganiſm. The firſt magicians mentioned in hiſtory were Egyptians; and that people ſo famed for early wiſdom believed not only in the exiſtence of dæmons, the great agents in magic (ſee DÆMON), but alſo that different orders of thoſe ſpirits preſided over the elements of earth, air, fire, and water, as well as over the perſons and affairs of men. Hence they aſcribed every diſeaſe with which they were afflicted to the immediate agency of ſome evil dæmon. When any perſon was ſeized with a fever, for inſtance, they did not think it neceſſary to ſearch for any natural cauſe of the diſeaſe; it was immediately attributed to ſome dæmon which had taken poſſeſſion of the body of the patient, and which could not to be ejected but by charms and incantations.

Theſe ſuperſtitious notions, which had ſpread from Egypt over all the eaſt, the Jews imbibed during their captivity in Babylon. Hence we find them in the writings of the New Teſtament attributing almoſt every diſeaſe to which they were incident to the immediate agency of devils (ſee POSSESSION). Many of the ſame impious ſuperſtitions were brought from Egypt and Chaldea by Pythagoras, and tranſmitted by him and his followers to the Platoniſts in Greece. This is apparent from the writers of the life of Pythagoras. Jamblicus, ſpeaking of the followers of that philoſopher, ſays expreſsly, that they cured certain diſeaſes by incantations; and Porphyry adds, that they cured diſeaſes both of the mind and of the body by ſongs and incantations. This was exactly the practice of the Egyptian prieſts, who were all ſuppoſed to keep up a conſtant intercourſe with dæmons, and to have the power of controuling them by magical charms and ſacred ſongs. Agreeably to this practice of his maſters, we are told that Pythagoras directed certain diſeaſes of the mind, doubtleſs thoſe which he attributed to the agency of dæmons, to be cured partly by *incantations*, partly by *magical hymns*, and partly by *muſic*.—και τας ψυχας δε νοσουσας παρεμυθειτο τους μεν επαδαις και μαγειαις τους δε μουσικη.

That there are different orders of created ſpirits, whether called dæmons or angels, whoſe powers intellectual and active greatly ſurpaſs the powers of man, reaſon makes probable, and revelation certain. Now it was the univerſal belief of the ancient nations, ſays the learned Moſheim *, and eſpecially of the orientals, that certain ſounds and words, for the moſt part barbarous, were highly grateful, and that others were equally diſagreeable, to theſe ſpirits. Hence, when they wiſhed to render a dæmon propitious, and to employ him on any particular office, the magicians compoſed their ſacred ſongs of the words which were believed to be agreeable to him; and when it was their intention to drive him from themſelves or others, they ſung in a ſtrain which they fancied a dæmon could not hear but with horror. From the ſame perſuaſion aroſe the cuſtom of ſuſpending from the neck of a ſick perſon, whoſe diſeaſe was ſuppoſed to be inflicted by a dæmon, an amulet, ſometimes made of gold and ſometimes of parchment on which was written one or more of thoſe words which dæmons could not bear either to hear or to ſee: and in a didactic poem on the healing art ſtill extant, we are taught by *Serenus Sammonicus*, that the word ABRACADABRA is an infallible remedy for a ſemitertian fever or ague; and to baniſh grief of heart, *Marcellinus* thinks nothing more effectual than the word καριαγκων. In more modern times, as we are informed by Agrippa, the words uſed by thoſe in compact with the devil, to invoke him, and to ſucceed in what they undertake, are, *Dies*, *mies*, *jeſquet*, *benedoefet*, *douvima*, *enitemaus*. There are a hundred other formulas of words compoſed at pleaſure, or gathered from ſeveral different languages, or patched from the Hebrew or formed in imitation of it. And among the primitive Chriſtians there was a ſuperſtitious cuſtom, of which we ſuſpect ſome remains may yet be found among the illiterate vulgar in different countries, of

† See Stillingfleet's *Origines Sacræ*, book iii. c. 2.

* See his edition of *Cudworth Intellectu. Syſtem.*

of faſtening to the neck of a ſick perſon, or to the bed on which he lay, ſome text from the New Teſtament, and eſpecially the firſt two or three verſes of the goſpel of St John, is a charm undoubtedly efficacious to baniſh the diſeaſe.

That magicians who could thus cure the ſick, were likewiſe believed to have the power of inflicting diſeaſes, and of working miracles, by means of their ſubſervient dæmons, need not be doubted. Ancient writers of good credit are full of the wonders which they performed. We ſhall mention a few of thoſe which are beſt atteſted, and inquire whether they might not have been effected by other means than the interpoſition of dæmons.

The firſt magicians of whom we read are thoſe who in Egypt oppoſed Moſes. And we are told, that, when Aaron caſt down his rod, and it became a ſerpent, they alſo did the like with their enchantments; "for they caſt down every man his rod, and they became ſerpents." This was a phenomenon which, it muſt be confeſſed, had a very miraculous appearance; and yet there ſeems to have been nothing in it which might not have been effected by ſlight of hand. The Egyptians, and perhaps the inhabitants of every country where ſerpents abound, have the art of depriving them of their power to do miſchief, ſo that they may be handled without danger. It was eaſy for the magicians, who were favoured by the court, to pretend that they changed their rods into ſerpents, by dexterouſly ſubſtituting one of thoſe animals in place of the rod. In like manner they might pretend to change water into blood, and to produce frogs; for if Moſes gave in theſe inſtances, as we know he did in others, any previous information of the nature of the miracles which were to be wrought, the magicians might eaſily provide themſelves in a quantity of blood and number of frogs ſufficient to anſwer their purpoſe of deceiving the people. Beyond this, however, their power could not go. It ſtopped where that of all workers in legerdemain muſt have ſtopt—at the failure of proper materials to work with. Egypt abounds with ſerpents; blood could be eaſily procured; and without difficulty they might have frogs from the river: But when Moſes produced lice from the duſt of the ground, the magicians, who had it not in their power to collect a ſufficient quantity of theſe animals, were compelled to own this to be an effect of divine agency.

The appearance of Samuel to Saul at Endor is the next miracle, ſeemingly performed by the power of magic, which we ſhall conſider. It was a common pretence of magicians, that they could raiſe up ghoſts from below, or make dead perſons appear unto them to declare future events; and the manner of their incantation is thus deſcribed by Horace:

> ——Pallor utraque
> Fecerat horrendas aſpectu. Scalpere terram
> Unguibus, et pullam divellere mordicus agnam
> Cœperunt: cruor in foſſam confuſus, ut inde
> Manes elicerent, animas reſponſa daturas.
>
> "With yellings dire they fill'd the place,
> And hideous pale was either's face.
> Soon with their nails they ſcrap'd the ground,
> And fill'd a magic trench profound
> With a black lamb's thick-ſtreaming gore,
> Whoſe members with their teeth they tore;
> That they might charm the ſprights to tell
> Some curious anecdotes from hell." FRANCIS.

Whether the witch of Endor made uſe of ſuch infernal charms as theſe, the ſacred hiſtorian has not informed us; but Saul addreſſed her, as if he believed that by ſome form of incantation ſhe could recal from the ſtate of departed ſpirits the ſoul of the prophet who had been for ſome time dead. In the ſubſequent apparition, however, which was produced, ſome have thought there was nothing more than a trick, by which a cunning woman impoſed upon Saul's credulity, making him believe that ſome confidant of her own was the ghoſt of Samuel. But had that been the caſe, ſhe would undoubtedly have made the pretended Samuel's anſwer as pleaſing to the king as poſſible, both to ſave her own life, which appears from the context to have been in danger, and likewiſe to have procured the larger reward. She would never have told her ſovereign, ſhe durſt not have told him, that he himſelf ſhould be ſhortly ſlain, and his ſons with him; and that the hoſt of Iſrael ſhould be delivered into the hands of the Philiſtines. For this reaſon many critics, both Jewiſh and Chriſtian, have ſuppoſed that the apparition was really a dæmon or evil angel, by whoſe aſſiſtance the woman was accuſtomed to work wonders, and to foretel future events. But it is ſurely very incredible, that one of the apoſtate ſpirits of hell ſhould have upbraided Saul for applying to a *ſorcereſs*, or ſhould have accoſted him in ſuch words as theſe: "Why haſt thou diſquieted *me*, to bring me up? Wherefore doſt thou aſk of *me*, ſeeing the *Lord* is departed from thee, and is become thine enemy! For the *Lord* hath rent the kingdom out of thine hand, and given it to thy neighbour, even to David. Becauſe thou obeyedſt not the voice of the *Lord*, therefore the *Lord* hath done this thing to thee this day." It is to be obſerved farther, that what was here denounced againſt Saul was really prophetic, and that the event anſwered to the prophecy in every particular. Now, though we do not deny that there are created ſpirits of penetration vaſtly ſuperior to that of the moſt enlarged human underſtanding; yet we dare maintain, that no finite intelligence could by its own mere capacity have ever found out the preciſe time of the two armies engaging, the ſucceſs of the Philiſtines, the conſequences of the victory, and the very names of the perſons that were to fall in battle. Saul and his ſons were indeed men of tried bravery, and therefore likely to expoſe themſelves to the greateſt danger: but after the menaces which he received from the apparition, he would have been impelled, one ſhould think, by common prudence, either to chicane with the enemy, or to retire from the field without expoſing himſelf, his ſons, and the whole army, to certain and inevitable deſtruction; and his falling deliberately, with the [illegible] of his conduct, were events which no limited underſtanding could either foreſee or certainly foretel. If to theſe circumſtances we add the ſuddenneſs of Samuel's appearance, with the effect which it had upon the ſorcereſs herſelf, we ſhall find reaſon to believe, that the apparition was that of no evil dæmon. There is not, we believe, upon record, another inſtance of any per-

Magic.

ſon's pretending to raiſe a ghoſt from below, without previouſly uſing ſome magical rites or ſome form of incantation. As nothing of that kind is mentioned in the caſe before us, it is probable that Samuel appeared before he was called. It is likewiſe evident from the narrative, that the apparition was not what the woman expected; for we are told, that "when ſhe ſaw Samuel, ſhe cried out for fear." And when the king exhorted her not to be afraid, and aſked what ſhe ſaw, "the woman ſaid, I ſee gods (*elohim*) aſcending out of the earth." Now, had ſhe been accuſtomed to do ſuch feats, and known that what ſhe ſaw was only her ſubſervient dæmon, it is not conceivable that ſhe could have been ſo frightened, or have miſtaken her familiar for *elohim* in any ſenſe in which that word can be taken. We are therefore ſtrongly inclined to adopt the opinion of thoſe who hold that it was Samuel himſelf who appeared and propheſied, not called up by the wretched woman or her dæmons, but, to her utter confuſion, and the diſgrace of her art, ſent by God to rebuke Saul's madneſs in a moſt affecting and mortifying way, and to deter all others from ever applying to magicians or dæmons for aſſiſtance when refuſed comfort from heaven. For though this hypotheſis may to a ſuperficial thinker ſeem to tranſgreſs the rule of Horace—*Nec deus interſit*, &c.—which is as applicable to the interpretation of ſcripture, as to the introduction of ſupernatural agency in human compoſitions; yet he who has ſtudied the theocratical conſtitution of Iſrael, the nature of the office which was there termed regal, and by what means the adminiſtration was in emergencies conducted, will have a different opinion; and at once perceive the *dignus vindice nodus*.

The ſudden and wonderful deſtruction of the army of Brennus the Gaul, has likewiſe been attributed to magic, or, what in this inquiry amounts to the ſame thing, to the interpoſition of evil ſpirits, whom the prieſts of Apollo invoked as gods. Thoſe barbarians had made an inroad into Greece, and inveſted the temple of Apollo at Delphi, with a view to plunder it of the ſacred treaſure. Their numbers and courage overpowered all oppoſition; and they were juſt upon the point of making themſelves maſters of the place, when, Juſtin informs us, that, to encourage the beſieged, the prieſts and propheteſs "adveniſſe deum *clamant*; eumque ſe vidiſſe deſilientem in templum per culminis aperta faſtigia. Dum omnes opem dei ſuppliciter implorant, juvenem ſupra humanum modum inſignis pulchritudinis, comiteſque ei duas armatas virgines, ex propinquis duabus Dianæ Minervæque ædibus occurriſſe, nec oculis tantum hæc ſe perſpexiſſe; audiſſe etiam ſtridorem arcus, ac ſtrepitum armorum: proinde ne cunctarentur, diis anteſignanis, hoſtem cædere, et victoriæ deorum ſocios ſe adjungere," ſummis obſecrationibus monebant. Quibus vocibus incenſi, omnes certatim in prælium proſiliunt. Præſentiam Dei et ipſi ſtatim ſenſere: nam et terræ motu portio montis abrupta Gallorum ſtravit exercitum, et confertiſſimi cunei non ſine vulneribus hoſtium diſſipati ruebant. Inſecuta deinde tempeſtas eſt, quæ grandine et frigore ſaucios ex vulneribus abſumpſit (A).

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This was unqueſtionably an extraordinary event: and it muſt be aſcribed either to the immediate interpoſition of the Supreme Being, to natural means, or to the agency of dæmons: there is no other alternative. But it is altogether incredible that the Supreme Being ſhould have miraculouſly interpoſed to defend the temple of a pagan divinity. It is very difficult to ſuppoſe that an earthquake, produced in the ordinary courſe of nature, ſhould have been foretold by the prieſts, or that it could have happened ſo opportunely for the preſervation of their treaſure from the hands of fierce barbarians. Nothing, therefore, it has been ſaid, remains, but either to allow the earthquake to have been produced by evil ſpirits, or to deny the truth of the hiſtorian's relation. But the cataſtrophe of Brennus's army is recorded in the ſame manner by ſo many ancient writers of good credit, that we cannot call in queſtion their veracity; and therefore, being unwilling to admit the agency of dæmons into this affair, it will be incumbent on us to ſhow by what human contrivance it might have been effected; for its arrival at ſo critical a juncture will not eaſily ſuffer us to ſuppoſe it a mere *natural* event.

"The inclination of a Pagan prieſt (ſays Biſhop Warburton †) to aſſiſt his god in extremity, will hardly be queſtioned; and the inclination of thoſe at *Delphi* was not ill ſeconded by their public management and addreſs. On the firſt rumour of Brennus's march againſt them, they iſſued orders, as from the oracle, to all the region round, forbidding the country people to ſecret or bear away their wine and proviſions. The effects of this order ſucceeded to their expectations. The half-ſtarved barbarians finding, on their arrival in *Phocis*, ſo great a plenty of all things, made ſhort marches, diſperſed themſelves over the country, and revelled in the abundance that was provided for them. This reſpite gave time to the friends and allies of the god to come to his aſſiſtance. Their advantages of ſituation likewiſe ſupported the meaſures which they had taken for a vigorous defence. The town and temple of Delphi were ſeated on a bare and cavernous rock, defended on all ſides with precipices inſtead

† *Julian.*

"(A) Called aloud that the god had arrived: That they had ſeen him leap into the temple through the aperture in the roof: That whilſt they were all humbly imploring his help, a youth of more than human beauty, accompanied by two virgins in armour, had run to their aſſiſtance from the neighbouring temples of Diana and Minerva; and that they had not only beheld theſe things with their eyes, but had alſo heard the whizzing of his bow and the clangor of his arms. They therefore earneſtly exhorted the beſieged not to neglect the heavenly ſignal, but to ſally out upon their enemies, and partake with the divinities of the glory of the victory." With theſe words the ſoldiers being animated, eagerly ruſhed to battle: and were themſelves quickly ſenſible of the preſence of the god; for part of the rock being torn away by an earthquake, rolled down upon the Gauls; whoſe thickeſt battalions being thus thrown into confuſion, fled, expoſed to the weapons of their enemies. Soon afterwards a tempeſt aroſe, which by cold and the fall of hailſtones cut off the wounded.

inſtead of walls. A large receſs within aſſumed the form of a theatre; ſo that the ſhouts of ſoldiers, and the ſounds of military inſtruments, re-echoing from rock to rock, and from cavern to cavern, increaſed the clamour to an immenſe degree; which, as the hiſtorian obſerves, could not but have great effects on ignorant and barbarous minds. The playing off theſe panic terrors was not indeed of itſelf ſufficient to repulſe and diſſipate an hoſt of fierce and hungry invaders, but it enabled the defenders to keep them at bay till a more ſolid entertainment was provided for them, in the *exploſion* and fall of that portion of the rock at the foot of which the greater part of the army lay encamped.

"Among the caverns in the ſacred rock, there was one which, from an intoxicating quality diſcovered in the ſteam which iſſued from it, was rendered very famous by being fitted to the recipient of the prieſteſs of Apollo (B). Now, if we only ſuppoſe this, or any other of the vapours emitted from the numerous fiſſures, to be endowed with that unctuous, or otherwiſe inflammatory quality, which modern experience ſhows to be common in mines and ſubterraneous places, we can eaſily conceive how the prieſts of the temple might, without the agency of dæmons, be able to work the wonders which hiſtory ſpeaks of as effected in this tranſaction. For the throwing down a lighted torch or two into a chaſm whence ſuch a vapour iſſued, would ſet the whole into a flame; which by ſuddenly rarefying and dilating the air, would, like fired gunpowder, blow up all before it. That the prieſts, the guardians of the rock, could be long ignorant of ſuch a quality, or that they would divulge it when diſcovered, cannot be ſuppoſed. Strabo relates, that one *Onomarchus*, with his companions, as they were attempting by night to dig their way through to rob the holy treaſury, were frightened from their work by the violent ſhaking of the rock; and he adds, that the ſame phenomenon had defeated many other attempts of the like nature. Now, whether the tapers which *Onomarchus* and his companions were obliged to uſe while they were at work, inflamed the vapour, or whether the prieſts of Apollo heard them at it, and ſet fire to a countermine, it is certain a quality of this kind would always ſtand them in ſtead. Such then (preſumes the learned prelate) was the expedient (C) they employed to diſlodge this neſt of hornets, which had ſettled at the foot of their ſacred rock; for the ſtorm of thunder, lightning, and hail, which followed, was the natural effect of the violent concuſſions given to the air by the exploſion of the mine."

Two inſtances more of the power of ancient magic we ſhall juſt mention, not becauſe there is any thing particular or important in the facts, but becauſe ſome credit ſeems to have been given to the narration by the diſcerning Cudworth. Philoſtratus, in his life of Apollonius Tyanæus, informs us that a *laughing dæmoniac* at Athens was cured by that magician, who ejected the evil ſpirit by threats and menaces; and the biographer adds, that the dæmon, at his departure, is ſaid to have overturned a ſtatue which ſtood before the porch where the cure was performed. The other inſtance is of the ſame magician freeing the city of Epheſus from the *plague*, by ſtoning to death an old ragged beggar whom Apollonius called the *plague*, and who appeared to be a *dæmon* by his changing himſelf into the form of a *ſhagged dog*.

That ſuch tales as theſe ſhould have been thought worthy of the ſlighteſt notice by the incomparable author of the Intellectual Syſtem, is indeed a wonderful phenomenon in the hiſtory of human nature. The whole ſtory of Apollonius Tyanæus, as is now well known, is nothing better than a collection of the moſt extravagant fables *: but were the narrative ſuch as that credit could be given to the facts here related, there appears no neceſſity in either caſe for calling in the agency of evil ſpirits by the power of magic.—The Athenians of that age were a ſuperſtitious people. Apollonius was a ſhrewd impoſtor, long practiſed in the art of deceiving the multitude. For ſuch a man it was eaſy to perſuade a friend and confidant to act the part of the *laughing demoniac*; and without much difficulty the ſtatue might be ſo undermined as inevitably to tumble, upon a violent concuſſion being given to the ground at the time of the departure of the pretended demon. If ſo, this feat of magic dwindles down into a very trifling trick performed by means both ſimple and natural. The other caſe of the poor man at Epheſus, who was ſtoned to death, is exactly ſimilar to that of thoſe innocent women in our own country, whom the vulgar in the laſt century were inſtigated to burn for the ſuppoſed crime of witchcraft. We have no reaſon to ſuppoſe that an Epheſian mob was leſs inflammable or credulous than a Britiſh mob, or that Apollonius played his part with leſs ſkill than a Chriſtian demonologiſt; and as the ſpirits of our witches, who were ſacrificed to folly and fanaticiſm, were often ſuppoſed to migrate from their dead bodies into the bodies of *hares* or *cats* accidentally paſſing by, ſo might this impoſtor at Epheſus perſuade his cruel and credulous inſtruments, that the ſpirit of their victim had taken poſſeſſion of the body of the *ſhagged dog*.

* *See Prideaux's Connexions, Brucker's History of Philoſophy, and Moſheim's Notes on Cudworth's Intellectual Syſtem.*

Still it may be ſaid, that in *magic* and *divination* events have been produced out of the ordinary courſe of nature; and as we cannot ſuppoſe the Supreme

Being

(B) "In hoc rupis anfractu, media ferme montis altitudine, planities exigua eſt, atque in ea profundum terræ foramen, quod in oraculo patet, ex quo frigidus ſpiritus, vi quadam velut vento in ſublimè expulſus, mentes vatum in vecordiam vertit, impletaſque deo reſponſa conſulentibus dare cogit." JUST. lib. 24. c. 10.

(C) The learned author, by arguments too tedious to be here enumerated, confirms the reaſoning which we have borrowed from him; and likewiſe ſhows from hiſtory, that the prieſts, before they came to extremities with the ſacred rock, had entered into treaty with thoſe barbarians, and paid them a large tribute to decamp and quit the country. This adds greatly to the probability of his account of the exploſion; for nothing but the abſolute impoſſibility of getting quit of their beſiegers by any other means, could have induced the prieſts to hazard an experiment ſo big with danger to themſelves as well as to their enemies.

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Being ſaid to have countenanced ſuch abominable practices by the intervention of his power, we muſt neceſſarily attribute theſe effects to the agency of demons, or evil ſpirits. Thus, when Æneas conſulted the Sibyl, the agency of the inſpiring god changed her whole appearance.

———— " Poſcere fata
Tempus," ait: "Deus, ecce, Deus." Cui talia fanti
Ante fores, ſubito non vultus, non color unus,
Non comptæ manſere comæ: ſed pectus anhelum,
Et rabie fera corda tument; majorque videri,
Nec mortale ſonans: afflata eſt numine quando
Jam propiore Dei. ————

———— " Aloud ſhe cries,
"This is the time, inquire your deſtinies.
He comes, behold a god!" Thus while ſhe ſaid,
And ſhiv'ring at the ſacred entry ſtaid,
Her colour chang'd, her face was not the ſame;
And hollow groans from her deep ſpirit came;
Her hair ſtood up; convulſive rage poſſeſs'd
Her trembling limbs, and heav'd her lab'ring breaſt;
Greater than human kind ſhe ſeem'd to look,
And with an accent more than mortal ſpoke.
Her ſtaring eyes with ſparkling fury roll,
When all the god came ruſhing on her ſoul."
DRYDEN.

In anſwer to this, it is to be obſerved, that the temple of Apollo at Cumæ was an immenſe excavation in a ſolid rock. The rock was probably of the ſame kind with that on which the temple of Delphi was built, full of fiſſures, out of which exhaled perpetually a poiſonous kind of vapour. Over one of theſe fiſſures was the tripod placed, from which the prieſteſs gave the oracle. Now we learn from St Chryſoſtom, that the prieſteſs was a woman: Quæ in tripodes ſedens expanſa malignum ſpiritum per interna immiſſum, et per genitales partes ſubeuntem excipiens, furore repleretur, ipſaque reſolutis crinibus baccharetur, ex ore ſpumam emittens, et ſic furoris verba loquebatur." By comparing this account with that quoted above from Juſtin, which is confirmed both by Pauſanius and by Strabo, it is evident, that what Chryſoſtom calls *malignum ſpiritum* was a particular kind of vapour blown forcibly through the fiſſure of the rock. But if there be a vapour of ſuch a quality as, if received *per partes genitales*, would make a woman furious, there is ſurely no neceſſity for calling into the ſcene at Cumæ the agency of a demon or evil ſpirit. Beſides, it is to be remembered, that in all myſtical and magical rites, ſuch as this was, both the prieſts, and the perſons conſulting them, prepared themſelves by particular kinds of food, and ſometimes, as there is reaſon to believe, by human ſacrifices †, for the approach of the god or demon whoſe aid they invoked. On the preſent occaſion, we know from the poet himſelf, that a cake was uſed which was compoſed of poppy-ſeed and honey; and Plutarch ſpeaks of a ſhrub called *leucophyllus*, uſed in the celebration of the myſteries of Hecate, which drives men into a kind of frenzy, and makes them confeſs all the wickedneſs which they had done or intended. This being the caſe, the illuſions of fancy occaſioned by poppy will ſufficiently account for the change of the ſibyl's appearance, even though the inhaled vapour ſhould not have poſſeſſed that efficacy which Chryſoſtom and Juſtin attribute to it. Even ſome ſorts of our ordinary food occaſion ſtrange dreams, for which onions in particular are remarkable. Exceſſive drunkenneſs, as is well known, produces a diſorder named by the bacchanalians of this country *the blue devils*, which conſiſts of an immenſe number of ſpectres, accompanied with extreme horror to the perſon who ſees them. From theſe facts, which cannot be denied there muſt ariſe a ſuſpicion, that by uſing very unnatural food, ſuch as human blood, the vileſt of inſects, ſerpents, and medicated cakes, by ſhutting themſelves up in ſolitudes and caves, and by deviſing every method to excite horrid and dreadful ideas or images in the fancy, the ancient magicians might by natural means produce every phenomenon which they attributed to their gods or demons. Add to this, that in ancient times magic was ſtudied as a ſcience. Now, as we cannot ſuppoſe that every one who ſtudied it intended abſolutely nothing, or that all who believed in it were *wholly* deceived; what can we infer, but that the ſcience conſiſted in the knowledge of thoſe drugs which produced the phantoms in the imagination, and of the method of preparing and properly employing them for that purpoſe? The celebrated Friar Bacon indeed, as far back as the 13th century, wrote a book *de Nullitate Magiæ*: but though we ſhould allow that this book proved to demonſtration, that in his time no ſuch thing as magic exiſted, it never could prove that the caſe had always been ſo. At that time almoſt all the ſciences were loſt; and why not magic as well as others? It is likewiſe an undoubted fact, that magic at all times prevailed among the Aſiatics and Africans more than among the Europeans. The reaſon doubtleſs was, that the former had the requiſites for the art in much greater perfection than we. Human ſacrifices were frequent among them; they had the moſt poiſonous ſerpents, and the greateſt variety of vegetable poiſons, together with that powerful narcotic opium; all which were of eſſential uſe in myſtical and magic rites. They had, beſides, a burning ſun, frightful deſerts and ſolitudes; which, together with extreme faſting, were all called in to their aſſiſtance, and were ſufficient to produce, by natural means, the moſt wonderful phenomena which have ever been attributed to magical incantations. Even in our own days, we have the teſtimony of two travellers, whom we cannot ſuſpect to be either liars or enthuſiaſts, that both the Indians and Africans perform feats for which neither they nor the moſt enlightened Europeans can account. The one is Mr Groſe, who viſited the Eaſt Indies about the year 1762; and the other is Mr Bruce, who informs us, that the inhabitants of the weſtern coaſt of Africa pretend to hold a communication with the devil, and verify their aſſertions in ſuch a manner that neither he nor other travellers know what to make of it: but it does not from this follow, that Mr Bruce believed that communication to be real. We have all ſeen one of the moſt illiterate men that ever aſſumed the title of *Doctor*, perform feats very ſurpriſing, and ſuch as even a philoſopher would have been puzzled to account for, if he had not been previouſly let into the ſecret; and yet no man ſuppoſes that *Katterfelto* holds any communication

† [illegible]

tion with the devil, although he has ſometimes pretended it among people whoſe minds he ſuppoſed unenlightened.

Still it may be objected, that we have a vaſt number of hiſtories of witches, who in the laſt century confeſſed, that they were preſent with the devil at certain meetings; that they were carried through the air, and ſaw many ſtrange feats performed, too numerous and too ridiculous to be here mentioned. The beſt anſwer to this objection ſeems to be that given by Dr Ferriar in his eſſay on Popular Illuſions *. "The ſolemn meeting of witches (ſays he) is ſuppoſed to be put beyond all doubt by the numerous confeſſions of criminals, who have deſcribed their ceremonies, named the times and places of their meetings, with the perſons preſent, and who have agreed in their relations, though ſeparately delivered. But I would obſerve, firſt, that the circumſtances told of thoſe feſtivals are in themſelves ridiculous and incredible; for they are repreſented as gloomy and horrible, and yet with a mixture of childiſh and extravagant fancies, more likely to diſguſt and alienate than conciliate the minds of their gueſts. They have every appearance of uneaſy dreams. Sometimes the devil and his ſubjects *ſay maſs;* ſometimes he *preaches* to them; more commonly he was ſeen in the form of a *black goat*, ſurrounded by imps in a thouſand frightful ſhapes; but none of theſe forms are *new*, they all reſemble known quadrupeds or reptiles. Secondly, I obſerve, that there is direct proof furniſhed even by demonologiſts, that *all* thoſe ſuppoſed journeys and entertainments were nothing more than dreams. Perſons accuſed of witchcraft have been repeatedly watched about the time they had fixed for their meeting: they have been ſeen to anoint themſelves with ſoporific compoſitions; after which they fell into profound ſleep; and on awaking ſeveral hours afterwards, they have related their journey through the air, with their amuſement at the feſtival, and have named the perſons whom they ſaw there." This is exactly conformable to the practice of the ancient magicians and diviners, and ſeems to be the true way of accounting, as well for many of the phenomena of magic, as for that extravagant and ſhameful ſuperſtition which prevailed ſo much during part of the laſt century, and by which ſuch numbers of innocent men and women were cruelly put to death (c). We may indeed be aſſured, that the devil has it not in his power to reverſe in a ſingle inſtance the laws of nature without a divine permiſſion; and we can conceive but one occaſion (ſee POSSESSION) on which ſuch permiſſion could be given conſiſtently with the wiſdom and the goodneſs of God. All the tales, therefore, of diabolical agency in magic and witchcraft muſt undoubtedly be falſe; for a power, which the devil is not himſelf at liberty to exert, he cannot communicate to a human creature. Were the caſe otherwiſe; were thoſe powers, "which (according to Johnſon) only the controul of Omnipotence reſtrains from laying creation waſte, ſubſervient to the invocations of wicked mortals; were thoſe ſpirits,—

——— of which the [illegible]

The elements, and arm him with the force

Of all their powers,"——[illegible] racles, and either to inflict or to remove [illegible] the deſire of their capricious votaries, how comfortleſs and wretched would be the life of man! But the matter has been long ago determined by the failure of Pharaoh's magicians; who, though by legerdemain they imitated ſome of the miracles of Moses, could not [illegible] inſect, or ſtand before the diſeaſe which he inflicted upon them as well as upon others.

The revival of learning, and the ſucceſs with which the laws of nature have been inveſtigated, have long ago baniſhed this ſpecies of magic from all the enlightened nations of Europe. Among ourſelves, none but perſons groſsly illiterate pay the leaſt regard to magical charms; nor are they anywhere abroad more prevalent than among the inhabitants of Lapland and Iceland. Theſe people, indeed, place an abſolute confidence in the effects of certain idle words and actions: and ignorant ſailors from other parts of the world are deceived by their aſſertions and their ceremonies. The famous *magical drum* of the Laplanders is ſtill in conſtant uſe in that nation; and Scheffer, in his Hiſtory of Lapland, has given an account of its ſtructure.

This inſtrument is made of beech, pine, or fir, ſplit in the middle, and hollowed on the flat ſide where the drum is to be made. The hollow is of an oval figure; and is covered with a ſkin clean dreſſed, and painted with figures of various kinds, ſuch as ſtars, ſuns and moons, animals and plants, and even countries, lakes and rivers; and of later days, ſince the preaching of Chriſtianity among them, the acts and ſufferings of our Saviour and his apoſtles are often added among the reſt. All theſe figures are ſeparated by lines into three regions or cluſters.

There is, beſides theſe parts of the drum, an index and a hammer. The index is a bundle of braſs or iron rings, the biggeſt of which has a hole in its middle, and the ſmaller ones are hung to it. The hammer or drumſtick is made of the horn of a rein-deer; and with this they beat the drum ſo as to make theſe rings move, they being laid on the top for that purpoſe. In the motion of theſe rings about the pictures figured on the drum, they fancy to themſelves ſome prediction in regard to the things they inquire about.

What they principally inquire into by this inſtrument, are three things. 1. What ſacrifices will prove moſt acceptable to their gods. 2. What ſucceſs they ſhall have in their ſeveral occupations, as hunting, fiſhing, curing of diſeaſes, and the like; and, 3. What is doing in places remote from them. On theſe ſeveral occaſions they uſe ſeveral peculiar ceremonies, and place themſelves in various odd poſtures as they beat the drum; which influences the rings to the one or the other ſide, and to come nearer to the one or the other ſet of figures. And when they have done this, they have a method of calculating a diſcovery, which they keep as a great ſecret, but which ſeems

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* *Mancheſter Tranſactions*, vol. iii.

(c) For ſome farther account of popular illuſions, ſee [illegible] MAGNETISM.

among the baubles of the imagination in the diviner or magician.

Magic Square, a ſquare figure, formed of a ſeries of numbers in mathematical proportion; ſo diſpoſed in parallel and equal ranks, as that the ſums of each row, taken either perpendicularly, horizontally, or diagonally, are equal.

Let the ſeveral numbers which compoſe any ſquare number (for inſtance, 1, 2, 3, 4, 5, &c. to 25 incluſive, the ſquare number) be diſpoſed, in their natural order, after each other in a ſquare figure of 25 cells, each in its cell; if now you change the order of theſe numbers and diſpoſe them in the cells in ſuch manner, as that the five numbers which fill a horizontal rank of cells, being added together, ſhall make the ſame ſum with the five numbers in any other rank of cells, whether horizontal or vertical, and even the ſame number with the five in each of the two diagonal ranks: this diſpoſition of numbers is called a *magic ſquare*, in oppoſition to the former diſpoſition, which is called a *natural ſquare*. See the figures following:

Natural Square.

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

Magic Square.

16	14	8	2	25
3	22	20	11	9
15	6	4	23	17
24	18	12	10	1
7	5	21	19	13

One would imagine that theſe magic ſquares had that name given then, in regard this property of all their ranks, which, taken any way, make always the ſame ſum, appeared extremely ſurpriſing, eſpecially in certain ignorant ages, when mathematics paſſed for magic; but there is a great deal of reaſon to ſuſpect, that theſe ſquares merited their name ſtill farther, by the ſuperſtitious operations they were employed in, as the conſtruction of taliſmans, &c. for, according to the childiſh philoſophy of thoſe days, which attributed virtues to numbers, what virtues might not be expected from numbers ſo wonderful?

However, what was at firſt the vain practice of makers of taliſmans and conjurors, has ſince become the ſubject of a ſerious reſearch among mathematicians; not that they imagine it will lead them to any thing of ſolid uſe or advantage (magic ſquares ſavour too much of their original to be of much uſe); but only as it is a kind of play, where the difficulty makes the merit, and it may chance to produce ſome new views of numbers, which mathematicians will not loſe the occaſion of.

Eman. Moſchopulus, a Greek author of no great antiquity, is the firſt that appears to have ſpoken of magic ſquares: and by the age wherein he lived, there is reaſon to imagine he did not look on them merely as a mathematician. However, he has left us ſome rules for their conſtruction. In the treatiſe of Cor. Agrippa, ſo much accuſed of magic, we find the ſquares of ſeven numbers, viz. from three to nine incluſive, diſpoſed magically; and it muſt not be ſuppoſed that thoſe ſeven numbers were preferred to all the other without very good reaſon: in effect, it is becauſe their ſquares, according to the ſyſtem of Agrippa and his followers, are planetary. The ſquare of 3, for inſtance, belongs to Saturn; that of 4 to Jupiter; that of 5 to Mars; that of 6 to the Sun; that of 7 to Venus; that of 8 to Mercury, and that of 9 to the Moon. M. Bachet applied himſelf to the ſtudy of magic ſquares, on the hint he had taken from the planetary ſquares of Agrippa, as being unacquainted with the work of Moſchopulus, which is only in manuſcript in the French king's library; and, without the aſſiſtance of any author, he found out a new method for thoſe ſquares whoſe root is uneven, for inſtance 25, 49, &c. but he could not make any thing of thoſe whoſe root is even.

Magic Square.

After him came M. Frenicle, who took the ſame ſubject in hand. A certain great algebraiſt was of opinion, that whereas the 16 numbers which compoſe the ſquare might be diſpoſed 20922789888000 different ways in a natural ſquare (as from the rules of combination it is certain they may), they could not be diſpoſed in a magic ſquare above 16 different ways; but M. Frenicle ſhowed, that they might be thus diſpoſed 878 different ways: whence it appears how much his method exceeds the former, which only yielded the 55th part of magic ſquares of that of M. Frenicle.

To this inquiry he thought fit to add a difficulty that had not yet been conſidered: the magic ſquare of 7, for inſtance, being conſtructed, and its 49 cells filled, if the two horizontal ranks of cells, and, at the ſame time, the two vertical ones, the moſt remote from the middle, be retrenched; that is, if the whole border or circumference of the ſquare be taken away, there will remain a ſquare whoſe root will be 5, and which will only conſiſt of 25 cells. Now it is not at all ſurpriſing that the ſquare ſhould be no longer magical, becauſe the ranks of the large ones were not intended to make the ſame ſum, excepting when taken entire with all the ſeven numbers that fill their ſeven cells; ſo that being mutilated each of two cells, and having loſt two of their numbers, it may be well expected, that their remainders will not any longer make the ſame ſum. But M. Frenicle would not be ſatisfied, unleſs when the circumference or border of the magic ſquare was taken away, and even any circumferences at pleaſure, or, in fine, ſeveral circumferences at once, the remaining ſquare was ſtill magical: which laſt condition, no doubt, made theſe ſquares vaſtly more magical than ever.

Again, He inverted that condition, and required that any circumference taken at pleaſure, or even ſeveral circumferences, ſhould be inſeparable from the ſquare; that is, that it ſhould ceaſe to be magical when they were removed, and yet continue magical after the removal of any of the reſt. M. Frenicle, however, gives no general demonſtration of his methods, and frequently ſeems to have no other guide but chance. It is true, his book was not publiſhed by himſelf, nor did it appear till after his death, viz. in 1693.

In 1703, M. Poignard, canon of Bruſſels, publiſhed a treatiſe of ſublime magic ſquares. Before him there had been no magic ſquares made but for ſerieſes of natural numbers that formed a ſquare; but M. Poignard made two very conſiderable improvements. 1. Inſtead of taking all the numbers that fill a ſquare, for inſtance the 36 ſucceſſive numbers, which would fill all the cells of a natural ſquare whoſe ſide is 6, he only takes as many ſucceſſive numbers as there are units

in

Magic Square.

in the ſide of the ſquare, which, in this caſe, are ſix: and theſe ſix numbers alone he diſpoſes in ſuch manner in the 36 cells, that none of them are repeated twice in the ſame rank, whether it be horizontal, vertical, or diagonal; whence it follows, that all the ranks, taken all the ways poſſible, muſt always make the ſame ſum, which M. Poignard calls repeated progreſſion. 2. Inſtead of being confined to take theſe numbers according to the ſeries and ſucceſſion of the natural numbers, that is, in an arithmetical progreſſion, he takes them likewiſe in a geometrical progreſſion, and even in an harmonical progreſſion. But with theſe two laſt progreſſions the magic muſt neceſſarily be different from what it was: in the ſquares filled with numbers in geometrical progreſſion, it conſiſts in this, that the products of all the ranks are equal; and in the harmonical progreſſion, the numbers of all the ranks continually follow that progreſſion: he makes ſquares of each of theſe three progreſſions repeated.

This book of M. Poignard gave occaſion to M. de la Hire to turn his thoughts the ſame way, which he did with ſuch ſucceſs, that he ſeems to have well nigh completed the theory of magic ſquares. He firſt conſiders uneven ſquares: all his predeceſſors on the ſubject having found the conſtruction of even ones by much the moſt difficult; for which reaſon M. de la Hire reſerves thoſe for the laſt. This exceſs of difficulty may ariſe partly from hence, that the numbers are taken in arithmetical progreſſion. Now in that progreſſion, if the number of terms be uneven, that in the middle has ſome properties, which may be of ſervice; for inſtance, being multiplied by the number of terms in the progreſſion, the product is equal to the ſum of all the terms.

M. de la Hire propoſes a general method for uneven ſquares, which has ſome ſimilitude with the theory of compound motions, ſo uſeful and fertile in mechanics. As that conſiſts in decompounding motions, and reſolving them into others more ſimple; ſo does M. de la Hire's method conſiſt in reſolving the ſquare that is to be conſtructed into two ſimple and primitive ſquares. It muſt be owned, however, it is not quite ſo eaſy to conceive theſe two ſimple and primitive ſquares in the compound or perfect ſquare, as in an oblique motion to imagine a parallel and perpendicular one.

Suppoſe a ſquare of cells, whoſe root is uneven, for inſtance 7; and that its 49 cells are to be filled magically with numbers, for inſtance the firſt 7; M. de la Hire, on the one ſide, takes the firſt 7 numbers, beginning with unity, and ending with the root 7; and on the other 7, and all its multiples to 49, excluſively; and as theſe only make ſix numbers, he adds 0, which makes this an arithmetical progreſſion of 7 terms as well as the other; 0. 7. 14. 21. 28. 35. 42. This done, with the firſt progreſſion repeated, he fills the ſquare of the root magically: In order to this, he writes in the firſt ſeven cells of the firſt horizontal rank the ſeven numbers propoſed in what order he pleaſes, for that is abſolutely indifferent: and it is proper to obſerve here, that theſe ſeven numbers may be ranged in 5040 different manners in the ſame rank. The order in which they are placed in the firſt horizontal rank, be it what it will, is that which determines their order in all the reſt. For the ſecond horizontal rank, he places in its firſt cell either the third, the fourth, the fifth, or the ſixth number, from the firſt number of the firſt rank; and after that writes the ſix others in order as they follow. For the third horizontal rank, he obſerves the ſame method with regard to the ſecond that he obſerved in the ſecond with regard to the firſt, and ſo of the reſt. For inſtance, ſuppoſe the firſt horizontal rank filled with the ſeven numbers in their natural order, 1, 2, 3, 4, 5, 6, 7; the ſecond horizontal rank may either commence with 3, with 4, with 5, or with 6: but in this inſtance it commences with 3; the third rank therefore muſt commence with 5, the fourth with 7, the fifth with 2, the ſixth with 4, and the ſeventh with 6. The commencement of the ranks which follow the firſt being thus determined, the other numbers, as we have already obſerved, muſt be written down in the order wherein they ſtand in the firſt, going on to 5, 6, and 7, and returning to 1, 2, &c. till every number in the firſt rank be found in every rank underneath, according to the order arbitrarily pitched upon at firſt. By this means it is evident, that no number whatever can be repeated twice in the ſame rank; and by conſequence, that the ſeven numbers 1, 2, 3, 4, 5, 6, 7, being in each rank, muſt of neceſſity make the ſame ſum.

1	2	3	4	5	6	7
3	4	5	6	7	1	2
5	6	7	1	2	3	4
7	1	2	3	4	5	6
2	3	4	5	6	7	1
4	5	6	7	1	2	3
6	7	1	2	3	4	5

It appears, from this example, that the arrangement of the numbers in the firſt rank being choſen at pleaſure, the other ranks may be continued in four different manners; and ſince the firſt rank may have 5040 different arrangements, there are no leſs than 20,160 different manners of conſtructing the magic ſquare of ſeven numbers repeated.

1	2	3	4	5	6	7
2	3	4	5	6	7	1
3	4	5	6	7	1	2
4	5	6	7	1	2	3
5	6	7	1	2	3	4
6	7	1	2	3	4	5
7	1	2	3	4	5	6

1	2	3	4	5	6	7
7	1	2	3	4	5	6
6	7	1	2	3	4	5
5	6	7	1	2	3	4
4	5	6	7	1	2	3
3	4	5	6	7	1	2
2	3	4	5	6	7	1

The order of the numbers in the firſt rank being determined; if in beginning with the ſecond rank, the ſecond number 2, or the laſt number 7, ſhould be pitched upon in one of theſe caſes, and repeated; and in the other caſe, the other diagonal would be falſe unleſs the number repeated ſeven times ſhould happen to be 4; for four times ſeven is equal to the ſum of 1, 2, 3, 4, 5, 6, 7: and in general, in every ſquare conſiſting of an unequal number of terms, in arithmetical progreſſion, one of the diagonals would be falſe, according to thoſe two conſtructions, unleſs the term always repeated in that diagonal were the middle term of the progreſſion. It is not, however, at all [illegible] two conftructions which produce a continual repetition of the fame term in one of the two diagonals, and only to take in the cafe wherein that repetition would prevent the diagonal from being juft; which cafe being abfolutely difregarded when we computed that the fquare of 7 might have 20,160 different conftructions, it is evident that by taking that cafe in, it muft have vaftly more.

To begin the fecond rank with any other number befides the fecond and the laft, muft not, however, be looked on as an univerfal rule: it holds good for the fquare of 7; but if the fquare of 9, for inftance, were to be conftructed, and the fourth figure of the firft horizontal rank were pitched on for the firft of the fecond, the confequence would be, that the fifth and eighth horizontal ranks would likewife commence with the fame number, which would therefore be repeated three times in the fame vertical rank, and occafion other repetitions in all the reft. The general rule, therefore, muft be conceived thus: Let the number in the firft rank pitched on, for the commencement of the fecond, have fuch an exponent of its quota; that is, let the order of its place be fuch, as that if an unit be taken from it, the remainder will not be any juft quota part of the root of the fquare; that is, cannot divide it equally. If, for example, in the fquare of 7, the third number of the firft horizontal rank be pitched on for the firft of the fecond, fuch conftruction will be juft; becaufe the exponent of the place of that number, viz. 3, fubtracting 1, that is, 2 cannot divide 7. Thus alfo might the fourth number of the fame firft rank be chofen, becaufe 4—1, viz. 3, cannot divide 7; and, for the fame reafon, the fifth or fixth number might be taken: but in the fquare of 9, the fourth number of the firft rank muft not be taken, becaufe 4—1, viz. 3, does divide 9. The reafon of this rule will appear very evidently, by confidering in what manner the returns of the fame numbers do or do not happen, taking them always in the fame manner in any given feries. And hence it follows, that the fewer divifions the root of any fquare to be conftructed has, the more different manners of conftructing it there are; and that the prime numbers, i. e. thofe which have no divifions, as 5, 7, 11, 13, &c. are thofe whofe fquares will admit of the moft variations in proportion to their quantities.

The fquares conftructed according to this method have fome particular properties not required in the problem; for the numbers that compofe any rank parallel to one of the two diagonals, are ranged in the fame order with the numbers that compofe the diagonal to which they are parallel. And as any rank parallel to a diagonal muft neceffarily be fhorter, and have fewer cells than the diagonal itfelf, by adding to it the correfpondent parallel, which has the number of cells by which the other falls fhort of the diagonal, the numbers of thofe two parallels, placed as it were end to end, ftill follow the fame order with thofe of the diagonal: befides that their fums are likewife equal; fo that they are magical on another account.

Firſt Primitive.

1	2	3	4	5	6	7
3	4	5	6	7	1	2
5	6	7	1	2	3	4
7	1	2	3	4	5	6
2	3	4	5	6	7	1
4	5	6	7	1	2	3
6	7	1	2	3	4	5

Inftead of the fquares which we have hitherto formed by horizontal ranks, one might alfo form them by vertical ones; the cafe is the fame in both.

All we have hitherto faid regards only the firft primitive fquare, whofe numbers, in the propofed example, were, 1, 2, 3, 4, 5, 6, 7; here ftill remains the fecond primitive, whofe numbers are, 0, 7, 14, 21, 28, 35, 42. M. de la Hire proceeds in the fame manner here as in the former; and this may likewife be conftructed in 20,160 different manners, as containing the fame number of terms with the firft. Its conftruction being made, and of confequence all its ranks making the fame fum, it is evident, that if we bring the two into one, by adding together the numbers of the two correfponding cells of the two fquares, that is, the two numbers of the firft of each, the two numbers of the fecond, of the third, &c. and difpofe them in the 49 correfponding cells of a third fquare, it will likewife be magical in regard to its rank, formed by the addition of equal fums to equal fums, which muft of neceffity be equal among themfelves. All that remains in doubt is, whether or no, by the addition of the correfponding cells of the two firft fquares, all the cells of the third will be filled in fuch manner, as that each not only contains one of the numbers of the progreffion from 1 to 49, but alfo that this number be different from any of the reft, which is the end and defign of the whole operation.

Second Primitive.

0	7	14	21	28	35	42
21	28	35	42	0	7	14
42	0	7	14	21	28	35
14	21	28	35	42	0	7
35	42	0	7	14	21	28
7	14	21	28	35	42	0
28	35	42	0	7	14	21

As to this it muft be obferved, that if in the conftruction of the fecond primitive fquare care has been taken, in the commencement of the fecond horizontal rank, to obferve an order with regard to the firft, different from what was obferved in the conftruction of the firft fquare; for inftance, if the fecond rank of the firft fquare began with the third term of the firft rank, and the fecond rank of the fecond fquare commence with the fourth of the firft rank, as in the example it actually does; each number of the firft fquare may be combined once, and only once, by addition with all the numbers of the fecond. And as the numbers of the firft are here 1, 2, 3, 4, 5, 6, 7, and thofe of the fecond, 0, 7, 14, 21, 28, 35, 42; by combining them in this manner we have all the numbers in the progreffion from 1 to 49, without having any of them repeated; which is the perfect magic fquare propofed.

Perfect Square.

1	9	17	25	33	41	49
24	32	40	48	7	8	16
47	6	14	15	23	31	39
21	22	30	38	46	5	13
37	45	4	12	20	28	29
11	19	27	35	36	44	3
34	42	43	2	10	18	26

The neceffity of conftructing the two primitive fquares in a different manner does not at all hinder but that each of the 20,160 conftructions of the one may be combined with all the 20,160 conftructions of the other: of confequence, therefore, 20,160 multiplied by itfelf, which makes 406,425,600, is the number of different conftructions that may be made of the perfect fquare, which here confifts of the 49 numbers of the natural progreffion. But as we have already obferved, that a primitive fquare of feven numbers repeated may have above 20,160 ſeveral conſtructions, the number 406,425,600 muſt come vaſtly ſhort of expreſſing all the poſſible conſtructions of a perfect magic ſquare of the 49 firſt numbers.

As to the even ſquares, he conſtructs them like the uneven ones, by two primitive ſquares; but the conſtruction of primitives is different in general, and may be ſo a great number of ways; and thoſe general differences admit of a great number of particular variations, which give as many different conſtructions of the ſame even ſquare. It hence ſeems impoſſible to determine exactly, either how many general differences there may be between the conſtruction of the primitive ſquares of an even ſquare and an uneven one, nor how many particular variations each general difference may admit of; and, of conſequence, we are ſtill far from being able to determine the number of different conſtructions of all thoſe that may be made by the primitive ſquares.

The ingenious Dr Franklin ſeems to have carried this curious ſpeculation farther than any of his predeceſſors in the ſame way. He has conſtructed not only a magic ſquare of ſquares, but likewiſe a magic circle of circles, of which we ſhall give ſome account for the amuſement of our readers. The magic ſquare of ſquares is formed by dividing the great ſquare, as in Plate CCXCVIII. The great ſquare is divided into 256 ſmall ſquares, in which all the numbers from 1 to 256 are placed in 16 columns, which may be taken either horizontally or vertically. The properties are as follow:

1. The ſum of the 16 numbers in each column, vertical and horizontal, is 2056.

2. Every half column, vertical and horizontal, makes 1028, or half of 2056.

3. Half a diagonal aſcending added to half a diagonal deſcending, makes 2056; taking theſe half diagonals from the ends of any ſide of the ſquare to the middle thereof; and ſo reckoning them either upward or downward, or ſidewiſe from left to right hand, or from right to left.

4. The ſame, with all the parallels to the half diagonals, as many as can be drawn in the great ſquare; for any two of them being directed upward and downward, from the place where they begin to that where they end, their ſums will make 2056. The ſame downward and upward in like manner: or all the ſame if taken ſidewiſe to the middle, and back to the ſame ſide again. *N. B.* One ſet of theſe half diagonals and their parallels is drawn in the ſame ſquare upward and downward. Another ſuch ſet may be drawn from any of the other three ſides.

5. The four corner numbers in the great ſquare, added to the four central numbers therein, make 1028; equal to the half ſum of any vertical or horizontal column which contains 16 numbers; and equal to half a diagonal or its parallel.

6. If a ſquare hole (equal in breadth to four of the little ſquares) be cut in a paper, through which any of the 16 little ſquares in the great ſquare may be ſeen, and the paper be laid on the great ſquare, the ſum of all the 16 numbers, ſeen through the hole, is equal to the ſum of the 16 numbers in any horizontal or vertical column, viz. to 2056.

The magic circle of circles, Plate CCXCVIII. is compoſed of a ſeries of numbers from 12 to 75 incluſive, divided into eight concentric circular ſpaces, and ranged in eight radii of numbers, with the number 12 in the centre; which number, like the centre, is common to all theſe circular ſpaces, and to all the radii.

The numbers are ſo placed, that the ſum of all thoſe in either of the concentric circular ſpaces above mentioned, together with the central number 12, make 360; equal to the number of degrees in a circle.

The numbers in each radius alſo, together with the central number 12, make juſt 360.

The numbers in half of any of the above circular ſpaces, taken either above or below the double horizontal line, with half the central number 12, make 180; equal to the number of degrees in a ſemicircle.

If any four adjoining numbers be taken, as if in a ſquare, in the radial diviſions of theſe circular ſpaces, the ſum of theſe, with half the central number, makes 180.

There are, moreover, included, four ſets of other circular ſpaces, bounded by circles which are eccentric with reſpect to the common centre; each of theſe ſets containing five ſpaces. The centres of the circles which bound them are at A, B, C, and D. The ſet whoſe centre is at A is bounded by dotted lines; the ſet whoſe centre is at C is bounded by lines of ſhort unconnected ſtrokes; and the ſet round D is bounded by lines of unconnected longer ſtrokes, to diſtinguiſh them from one other. In drawing this figure by hand, the ſet of concentric circles ſhould be drawn with black ink, and the four different ſets of eccentric circles with four kinds of ink of different colours; as blue, red, yellow, and green, for diſtinguiſhing them readily from one another. Theſe ſets of eccentric circular ſpaces interſect thoſe of the concentric, and each other; and yet the numbers contained in each of the eccentric ſpaces, taken all around through any of the 20 which are eccentric, make the ſame ſum as thoſe in the concentric, namely 360, when the central number 12 is added. Their halves alſo, taken above or below the double horizontal line, with half the central number, make 180.

Obſerve, that there is not one of the numbers but what belongs at leaſt to two of the circular ſpaces, ſome to three, ſome to four, ſome to five; and yet they are all ſo placed as never to break the required number 360 in any of the 28 circular ſpaces within the primitive circle.

To bring theſe matters in view, all the numbers as above mentioned are taken out, and placed in ſeparate columns as they ſtand around both the concentric and eccentric circular ſpaces, always beginning with the outermoſt and ending with the innermoſt of each ſet, and alſo the numbers as they ſtand in the eight radii, from the circumference to the centre: the common central number 12 being placed the loweſt in each column.

Magic Squares.

1. In the eight concentric circular ſpaces.

14	72	23	65	21	67	12	74
25	63	16	70	18	68	27	61
30	50	39	49	37	51	28	58
41	47	32	54	34	52	43	45
46	40	55	33	53	35	44	42
57	31	48	38	50	36	59	29
62	24	71	17	69	19	60	26
73	15	64	22	66	20	75	13
12	12	12	12	12	12	12	12
360	360	360	360	360	360	360	360

2. In the eight radii.

14	25	30	41	46	57	62	73
72	63	50	47	40	31	24	15
23	16	39	32	55	48	71	64
65	70	49	54	33	38	17	22
21	18	37	34	53	50	69	66
67	68	51	52	35	36	19	20
12	27	28	43	44	59	60	75
74	61	58	45	42	29	26	13
12	12	12	12	12	12	12	12
360	360	360	360	360	360	360	360

3. In the five eccentric circular ſpaces whoſe centre is at A.

14	72	23	85	21
63	16	70	18	68
39	49	37	51	28
54	34	52	43	45
33	53	35	44	42
48	38	50	36	59
24	71	17	69	19
73	15	64	22	66
12	12	12	12	12
360	360	360	360	360

4. In the five eccentric circular ſpaces whoſe centre is at B.

30	56	39	49	37
47	32	54	34	52
55	33	53	35	44
38	50	36	59	29
17	69	19	60	26
64	22	66	20	75
72	23	65	21	67
25	63	16	70	18
12	12	12	12	12
360	360	360	360	360

5. In the five eccentric circular ſpaces whoſe centre is at C.

46	40	55	33	53
31	48	38	50	36
71	17	69	19	60
22	66	20	75	13
65	21	67	12	74
16	70	18	68	27
56	39	49	37	51
41	47	32	54	34
12	12	12	12	12
360	360	360	360	360

6. In the five eccentric circular ſpaces whoſe centre is at D.

62	24	71	17	69
15	64	22	66	20
24	65	21	67	12
70	18	68	27	61
49	37	51	28	58
32	54	34	52	43
40	55	33	53	35
57	31	48	38	50
12	12	12	12	12
360	360	360	360	360

If, now, we take any four numbers, in a ſquare form, either from N 1. or N° 2, (we ſuppoſe from N° 1.) as in the margin, and add half the central number 12 to them, the ſum will be 180; equal to half the numbers in any circular ſpace taken above or below the double horizontal line, and equal to the number of degrees in a ſemicircle. Thus, 14, 72, 25, 63, and 6, make 180.

14	72
25	63

6

Magic Lantern. See Dioptrics, art. x.

Mag
Lante
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Magli
bech

MAGICIAN, one who practiſes magic, or hath the power of doing wonderful feats by the agency of ſpirits.

Among the eaſtern nations it ſeems to have been formerly common for the princes to have magicians about their court to confer with upon extraordinary occaſions. And concerning theſe there hath been much diſputation: ſome ſuppoſing that their power was only feigned, and that they were no other than impoſtors who impoſed on the credulity of their ſovereigns; while others have thought that they really had ſome unknown connexion or correſpondence with evil ſpirits, and could by their means accompliſh what otherwiſe would have been impoſſible for men. See the article Magic.

MAGINDANAO, or Mindanao. See Mindanao.

MAGISTERY, an old term in chemiſtry, given to precipitates. Thus, *magiſtery* and *precipitate* are ſynonymous; formerly *precipitate* was a general term, and *magiſtery* applied to particular precipitates, ſuch as the magiſtery of biſmuth, &c. See Bismuth, Chemistry *Index*.

MAGISTRATE, any public officer to whom the executive power of the law is committed either wholly or in part.

MAGLIABECHI, Antony, a perſon of great learning, and remarkable for an amazing memory, was born at Florence in 1633. His father died when he was only ſeven years old. His mother had him taught grammar and drawing, and then put him apprentice to one of the beſt goldſmiths in Florence. When he was about 16 years old, his paſſion for learning began to appear; and he laid out all his money in buying books. Becoming acquainted with Michael Ermini, librarian to the cardinal de Medicis, he ſoon perfected himſelf by his aſſiſtance in the Latin tongue, and in a little time became maſter of the Hebrew. His name ſoon became famous among the learned. A prodigious memory was his diſtinguiſhing talent; and he retained not only the ſenſe of what he had read, but frequently all the words and the very manner of ſpelling. It is ſaid that a gentleman, to make trial of the force of his memory, lent him a manuſcript he was going to print. Some time after it was returned, the gentleman, coming to him with a melancholy countenance, pretended it was loſt, and requeſted Magliabechi to recollect what he remembered of it; upon which he wrote the whole, without miſſing a word. He generally ſhut himſelf up the whole day, and opened his doors in the evening to the men of letters who came to converſe with him. His attention was ſo abſorbed by his ſtudies, that he often forgot the moſt urgent wants of nature. Coſmo III. grand duke of Florence, made him his librarian; but he ſtill continued negligent in his dreſs, and ſimple in his manners. An old cloak ſerved him for a morning gown in the day and for bed-clothes at night. The duke, however, provided for him a commodious apartment in his palace, which he was with difficulty perſuaded to take poſſeſſion of; but which he quitted four months after, and returned to his houſe. He was remarkable for his extraordinary modeſty, his ſincerity, and his beneficence, which his friends often experienced in their wants. He was a patron of men of learning; and had the higheſt pleaſure in aſſiſting them with his advice and information, and in furniſhing them with books and manuſcripts. He had the utmoſt averſion at any thing that looked like conſtraint; and therefore the grand duke always diſpenſed with his perſonal attendance, and ſent him his orders in writing. Though he lived a very ſedentary life, he reached the 81ſt year of his age; and died in the midſt of the public applauſe, after enjoying, during the latter part of his life, ſuch affluence as few have ever procured by their learning. By his will, he left a very fine library to the public, with a fund for its ſupport.

MAGLOIRE, St, a native of Wales in Great Britain, and couſin german to St Sampſon and St Mallo. He embraced a monaſtic life, and went into France, where he was made abbot of Dol, and after that a provincial biſhop in Britanny. He afterwards founded a monaſtery in the iſland of Jerſey, where he died on the 14th of October 575, about the age of 80. His remains were tranſported to the ſuburb of St Jacques, and depoſited in a monaſtery of Benedictines, which was ceded to the fathers of the oratory in 1628. It is now the ſeminary of St Magloire, celebrated on account of the learned men whom it has produced.—This ſaint cultivated poetry with conſiderable ſucceſs: the hymn which is ſung on the feaſt of All Saints was compoſed by him; *Cœlo quos eadem gloria conſecrat*, &c.

MAGNA ASSISA ELIGENDA, is a writ anciently directed to the ſheriff for ſummoning four lawful knights before the juſtices of aſſize, in order to chooſe 12 knights of the neighbourhood, &c. to paſs upon the great aſſize between ſuch a perſon plaintiff and ſuch a one defendant.

Magna Charta. See CHARTA.

MAGNANIMITY, denotes greatneſs of mind, particularly in circumſtances of trial and adverſity.—It has been juſtly obſerved of it, that it is the good ſenſe of pride, and the nobleſt way of acquiring applauſe. It renders the ſoul ſuperior to the trouble, diſorder, and emotion, which the appearance of great danger might excite; and it is by this quality that heroes maintain their tranquillity, and preſerve the free uſe of their reaſon, in the moſt ſurpriſing and dreadful accidents. It admires the ſame quality in its enemy; and fame, glory, conqueſts, deſire of opportunities to pardon and oblige their oppoſers, are what glow in the minds of the brave. Magnanimity and courage are inſeparable.

1. The inhabitants of Privernum being ſubdued and taken priſoners after a revolt, one of them being aſked by a Roman ſenator, who was for putting them all to death, what puniſhment he and his fellow captives deſerved? anſwered with great intrepidity, "We deſerve that puniſhment which is due to men who are jealous of their liberty, and think themſelves worthy of it." Plautinus perceiving that his anſwer exaſperated ſome of the ſenators, endeavoured to prevent the ill effects of it, by putting a milder queſtion to the priſoner: How would you behave (ſays he) if Rome ſhould pardon you?" "Our conduct (replied the generous captive) depends upon yours. If the peace you grant be an honourable one, you may depend on a conſtant fidelity on our parts: if the terms of it be hard and diſhonourable, lay no ſtreſs on our adherence to you." Some of the judges conſtrued theſe words as menaces; but the wiſer part finding in them a great deal of magnanimity, cried out, that a nation whoſe only deſire was liberty, and their only fear that of loſing it, was worthy to become Roman. Accordingly, a decree paſſed in favour of the priſoners, and Privernum was declared a municipium. Thus the bold ſincerity of one man ſaved his country, and gained it the privilege of being incorporated into the Roman ſtate.

2. Subrius Flavius, the Roman tribune, being impeached for having conſpired againſt the life of the emperor Nero, not only owned the charge, but gloried in it. Upon the emperor's aſking him what provocation he had given him to plot his death: Becauſe I abhorred thee (ſaid Flavius), though there was not in the whole army one more zealouſly attached to thee than I, ſo long as thou didſt merit affection; but I began to hate thee when thou becameſt the murderer of thy mother, the murderer of thy brother and wife, a charioteer, a comedian, an incendiary, and a tyrant." Tacitus tells us, that the whole conſpiracy afforded nothing which proved ſo bitter and pungent to Nero as this reproach. He ordered Flavius to be immediately put to death, which he ſuffered with amazing intrepidity. When the executioner deſired him to ſtretch out his neck valiantly, "I wiſh (replied he) thou mayeſt ſtrike as valiantly."

3. When the Scythian ambaſſadors waited on Alexander the Great, they gazed attentively upon him for a long time without ſpeaking a word, being very probably ſurpriſed, as they formed a judgement of men from their air and ſtature, to find that his did not anſwer the high idea they entertained of him from his fame. At laſt, the oldeſt of the ambaſſadors (according to Q. Curtius) addreſſed him thus: "Had the gods given thee a body proportionable to thy ambition, the whole univerſe would have been too little for thee. With one hand thou wouldſt touch the eaſt, and with the other the weſt; and, not ſatisfied with this, thou wouldſt follow the ſun, and know where he hides

himſelf. But what have we to do with thee? we never ſet foot in thy country. May not thoſe who inhabit woods be allowed to live, without knowing who thou art, and whence thou comeſt? We will neither command over, nor ſubmit to, any man. And that thou mayeſt be ſenſible what kind of people the Scythians are, know, that we received from heaven as a rich preſent, a yoke of oxen, a ploughſhare, a dart, a javelin, and a cup. Theſe we make uſe of, both with our friends and againſt our enemies. To our friends we give corn, which we procure by the labour of our oxen; with them we offer wine to the gods in our cup; and with regard to our enemies, we combat them at a diſtance with our arrows, and near at hand with our javelins. But thou, who boaſteſt thy coming to extirpate robbers, thou thyſelf art the greateſt robber upon earth. Thou haſt plundered all nations thou overcameſt; thou haſt poſſeſſed thyſelf of Lydia, invaded Syria, Perſia, and Bactriana; thou art forming a deſign to march as far as India; and now thou comeſt hither to ſeize upon our herds of cattle. The great poſſeſſions thou haſt, only make thee covet more eagerly what thou haſt not. If thou art a god, thou oughteſt to do good to mortals, and not deprive them of their poſſeſſions. If thou art a mere man, reflect always on what thou art. They whom thou ſhalt not moleſt will be thy true friends, the ſtrongeſt friendſhips being contracted between equals; and they are eſteemed equals who have not tried their ſtrength againſt each other; but do not imagine that thoſe whom thou conquereſt can love thee."

Rapin's Hiſt. ann. 1199. 4. Richard I. king of England, having inveſted the caſtle of Chalus, was ſhot in the ſhoulder with an arrow; an unſkilful ſurgeon endeavouring to extract the weapon, mangled the fleſh in ſuch a manner, that a gangrene enſued. The caſtle being taken, and perceiving he ſhould not live, he ordered Bertram de Gourdon, who had ſhot the arrow, to be brought into his preſence. Bertram being come, "What harm (ſaid the king) did I ever do thee, that thou ſhouldſt kill me?" The other replied with great magnanimity and courage, "You killed with your own hand my father and two of my brothers, and you likewiſe deſigned to have killed me. You may now ſatiate your revenge. I ſhould cheerfully ſuffer all the torments that can be inflicted, were I ſure of having delivered the world of a tyrant who filled it with blood and carnage." This bold and ſpirited anſwer ſtruck Richard with remorſe. He ordered the priſoner to be preſented with one hundred ſhillings, and ſet at liberty: but Marcardee, one of the king's friends, like a true ruffian, ordered him to be flayed alive.

5. The following modern inſtance is extracted from a French work entitled, *Ecole hiſtorique et morale du ſoldat*, &c. A mine, underneath one of the outworks of a citadel, was intruſted to the charge of a ſerjeant and a few ſoldiers of the Piedmonteſe guards. Several companies of the enemy's troops had made themſelves maſters of this work; and the loſs of the place would probably ſoon have followed had they maintained their poſt in it. The mine was charged, and a ſingle ſpark would blow them all into the air. The ſerjeant, with the greateſt coolneſs, ordered the ſoldiers to retire, deſiring them to requeſt the king to take care of his wife and children; ſtruck fire, ſet a match to the train, and ſacrificed himſelf for his country.

MAGNESA, or MAGNESIA, in *Ancient Geography*, a town or a diſtrict of Theſſaly, at the foot of Mount Pelius, called by Philip, the ſon of Demetrius, one of the three keys of Greece, (Pauſanias.)

MAGNESIA, or MAGNESIA ALBA, in *Chemiſtry*, a peculiar kind of earth. See CHEMISTRY *Index*.

Black MAGNESIA. See MANGANESE, CHEMISTRY and MINERALOGY *Index*.

MAGNESIA, in *Ancient Geography*, a maritime diſtrict of Theſſaly, lying between the ſouth part of the Sinus Thermaïcus and the Pegaſæus to the ſouth, and to the eaſt of the Pelaſgiotis. *Magnetes*, the people. *Magneſius* and *Magneſſus*, the epithet; (Horace).

MAGNESIA, a town of Aſia Minor on the Mæander, about 15 miles from Epheſus. Themiſtocles died there: it was one of the three towns given him by Artaxerxes, with theſe words, "to furniſh his table with bread." It is alſo celebrated for a battle which was fought there, 190 years before the Chriſtian era, between the Romans and Antiochus king of Syria. The forces of Antiochus amounted to 70,000 men according to Appian, or 70,000 foot and 12,000 horſe according to Livy, which has been exaggerated by Florus to 300,000 men; the Roman army conſiſted of about 28,000 or 30,000 men, 2000 of whom were employed in guarding the camp. The Syrians loſt 50,000 foot and 4000 horſe; and the Romans only 300 killed, with 25 horſe. It was founded by a colony from Magneſia in Theſſaly; and was commonly called *Magneſia ad Mæandrum*, to diſtinguiſh it from another called *Magneſia ad Sipylum* in Lydia at the foot of Mount Sipylus.

MAGNESIA *ad Sipylum*, anciently *Tantalis*, the reſidence of Tantalus, and capital of Mæonia, where now ſtands the lake Sale. A town of Lydia, at the foot of Mount Sipylus, to the eaſt of the Hermus; adjudged free under the Romans. It was deſtroyed by an earthquake in the reign of Tiberius.

MAGNET (*Magnes*) the LOADSTONE: a ſpecies of iron ore. See MAGNETISM, and MINERALOGY *Index*.

The magnet is alſo called *Lapis Heracleus*, from Heraclea, a city of Magneſia, a port of the ancient Lydia, where it is ſaid to have been firſt found, and from which it is uſually ſuppoſed to have taken its name. Though others derive the word from a ſhepherd named *Magnes*, who firſt diſcovered it with the iron of his crook on Mount Ida. It is alſo called *Lapis Nauticus*, from its uſe in navigation; and *ſiderites*, from its attracting iron, which the Greeks call σιδηρος.

The ancients reckoned five kinds of magnets, different in colour and virtue; the Ethiopic, Magneſian, Bœotic, Alexandrian, and Natolian. They alſo took it to be male and female: but the chief uſe they made of it was in medicine; eſpecially for the cure of burns and defluxions on the eyes.—The moderns, more fortunate in its application, employ it to conduct them in their voyages. See NAVIGATION.

The moſt diſtinguiſhing properties of the magnet are, That it attracts iron, and that it points to the poles of the world; and in other circumſtances alſo dips or inclines

clines to a point beneath the horizon, directly under the pole; and that it communicates theſe properties, by touch, to iron. On which foundation are built the mariner's needles, both horizontal and inclinatory.

Attractive Power of the Magnet was known to the ancients; and is mentioned even by Plato and Euripides, who call it the *Herculean ſtone*, becauſe it commands iron, which ſubdues every thing elſe: but the knowledge of its directive power, whereby it diſpoſes its poles along the meridian of every place, and occaſions needles, pieces of iron, &c. touched with it, to point nearly north and ſouth, is of a much later date; though the exact time of its diſcovery, and the diſcoverer himſelf, are yet in the dark. The firſt mention we have of it is in 1260, when Marco Polo the Venetian is ſaid by ſome to have introduced the mariner's compaſs; though not as an invention of his own, but as derived from the Chineſe, who are ſaid to have had the uſe of it long before; though ſome imagine that the Chineſe rather borrowed it from the Europeans.

Flavio de Gioia, a Neapolitan, who lived in the 13th century, is the perſon uſually ſuppoſed to have the beſt title to the diſcovery; and yet Sir G. Wheeler mentions, that he had ſeen a book of aſtronomy much older, which ſuppoſed the uſe of the needle; though not as applied to the uſes of navigation, but of aſtronomy. And in Guyot de Provins, an old French poet, who wrote about the year 1180, there is expreſs mention made of the loadſtone and the compaſs, and their uſe in navigation obliquely hinted at.

The Variation of the Magnet, or its declination from the pole, was firſt diſcovered by Seb. Cabot, a Venetian, in 1520; and the variation of that variation, by Mr Gellibrand, an Engliſhman, about the year 1625. See Variation.

Laſtly, The dip or inclination of the needle, when at liberty to play vertically, to a point beneath the horizon, was firſt diſcovered by another of our countrymen, Mr R. Norman, about the year 1576. See the article *Dipping Needle*.

MAGNETICAL needle. See *Needle, Magnetical*.

MAGNETISM.

INTRODUCTION.

General Principles.

1 General idea of magnetiſm.

If the mineral body called *magnet* or *loadſtone* (an ore of iron which will be deſcribed under Mineralogy) is brought within a moderate diſtance from a piece of iron or ſteel, or other ferruginous body, ſuch as a ſmall key, a ſewing needle, or the like, the ferruginous body will approach the magnet; and if no obſtacle intervene, will come in contact with it, and the two bodies will adhere together, ſo as to require an evident force to ſeparate them from each other.

2 Magnetic polarity or directive power.

Again, if a magnet be freely balanced, ſo that it be left at liberty to aſſume any direction, as if be ſuſpended by a thread, or made to float on the ſurface of water by placing it on a piece of cork or wood, it will ſoon ſettle itſelf in one particular direction, ſo as to turn one part of its ſurface towards the northern point of the horizon, and the oppoſite part of courſe towards the ſouthern point. Theſe two parts of the ſurface of the magnet are called its *north* and *ſouth* poles; this property of the magnet, of aſſuming this particular direction, is called its *polarity*, or its *directive power;* and when a magnet is placed ſo as to arrange itſelf in ſuch a direction, it is ſaid to *traverſe*.

3 Declination of the magnet.

The direction in which a ſuſpended magnet finally ſettles is called the *magnetic meridian*, and it is different in different places, and at different times. It is generally, however, very different from the real meridian line, ſo that the north pole of a magnet declines a little to the eaſt or weſt, and the ſouth pole to the weſt or eaſt. The difference of the magnetic from the aſtronomical meridian, is called the *declination*, or *variation* of the magnet; and the declination is ſaid to be eaſt or weſt, according as the north pole of the magnet verges to the one or the other of theſe points.

4 Dipping of the magnet.

If an oblong magnet be ſuſpended on a pivot by its centre of gravity, it does not ſettle in a perfectly horizontal poſition, but one of its poles is depreſſed below the horizontal line, and the other elevated as far above it, making an angle with the horizon that is alſo different on different parts of the earth's ſurface. This depreſſion of one of the poles is called the *dipping* of the magnet.

5 If two magnets that are each freely ſuſpended, be brought within a moderate diſtance from each other, ſo that the north pole of the one is oppoſed to the ſouth pole of the other, they will attract each other; and if no obſtacle intervene, will ruſh together: but if the two north poles, or the two ſouth poles, be mutually oppoſed, the magnets will repel each other.

6 Such are the leading properties of what is called the natural magnet; but what is of more importance, as we ſhall ſee hereafter, any piece of iron or ſteel may, by being rubbed with a natural magnet, or by ſome other proceſſes to be afterwards explained, be made to acquire the ſame properties, and thus in every uſeful reſpect ſerve the ſame purpoſes as the natural magnet. Theſe pieces of iron or ſteel thus magnetiſed, are called *artificial* magnets; and when they are of a ſlender, oblong form, they are termed *magnetic needles*. When afterwards we ſpeak of the polarity, the declination, or the dipping of the magnetic needle, we would be underſtood as alluding to theſe ſlender, oblong, artificial magnets.

7 Axis and equator of a magnet.

A ſtraight line joining the two poles of a magnet is called its axis, and a line drawn tranſverſely on the ſurface of the magnet, perpendicular to the axis, is called the *equator*.

8 Magnetic power.

The properties of natural and artificial magnets above enumerated, are attributed to the agency of ſome unknown force or power, either inherent in the magnet, or imparted to it by the proceſſes to which it is ſubjected. This force is ſometimes called *magnetiſm*, but we ſhall for the preſent denominate it the *magnetic* *power*, reſtricting the term magnetiſm to the ſcience that illuminates and attempts to explain the phenomena.

9 Utility of magnetiſm. The moſt important property of the magnet is its polarity, as it is by means of this that the mariner is enabled to find his way along the trackleſs ocean, where, before the diſcovery of this important property, he had no other guide but the ſtars, and could therefore ſeldom venture far from the coaſt. It is by this property too, that the miner is enabled to purſue a direct courſe through the bowels of the earth, or the traveller direct his ſteps through immenſe foreſts, or over ſandy deſerts. The uſes of the magnet are therefore obvious and important, and the ſcience which places theſe uſes in the beſt point of view, and thus enables us to turn them to the greateſt advantage, is well deſerving our attention. Many of the facts to be related under this article are highly curious, and form a pleaſing addition to thoſe ſcientific amuſements which are ſo well calculated to excite the attention of beginners in the ſtudy of experimental philoſophy.

[illegible] It is unneceſſary for us to attempt giving here a hiſtory of the origin and progreſs of our knowledge in magnetiſm. To a general reader, it would be unintereſting, and to ſuch as are better informed, ſuperfluous. We ſhall only mention the moſt important works that have appeared on the ſubject.

Few treatiſes expreſsly on magnetiſm have appeared in this country. In the year 1600, Dr Gilbert, a phyſician of Colcheſter, and the friend of Lord Bacon, publiſhed an excellent work *De Magnete et Corporibus Magneticis*, which is ſtill perhaps the moſt valuable that we poſſeſs. Mr Cavallo's Treatiſe on Magnetiſm, firſt publiſhed in 1787, contains a great variety of facts and experiments; and a neat compendium of this is given in the 3d volume of the ſame author's Elements of Natural and Experimental Philoſophy. Mr Cavallo's Treatiſe, and Mr Adams's Eſſay on Magnetiſm, form the ſubſtance of moſt of the compilations on this ſubject that have lately appeared.

To thoſe who wiſh to enter minutely on the ſtudy of magnetiſm, the following liſt of foreign publications recommended by the late Profeſſor Robiſon of Edinburgh will be acceptable.

Æpini Tentamen Theoriæ Magn. et Electr.

Eberhard's Tentam. Theor Magnetiſmi, 1720.

Diſſertations ſur l'Aimant, par du Fay, 1728.

Muſchenbroek Diſſert. Phyſico-Experimentalis de Magnete.

Pieces qui ont emporté la priſe de l'Acad. des Sciences à Paris ſur la meillure conſtruction des Bouſſoles de declination. Recueil des pieces couronneés, tom. v.

Euleri Opuſcula, tom. iii. continens Theoriam Magnetis. Berlin, 1751.

Æpini Oratio Academica, 1758.

Æpini item Comment. [illegible] nov. tom. x.

Anton. Brugmanni Tentamen. Phil. de Materia Magnetica. Franqueræ, 1765.

There is a German tranſlation of this work by Eſchenbach, with many valuable additions.

Scarella de Magnete, 2 tom. fol.

Van Swinden ſur l'Analogie entre les phenomenes Electriques et Magnetiques, 3 tom. 8vo.

Diſſertation ſur les Aimants Artificielles, par Nicholas Fuſs, 1782.

Eſſai ſur l'Origine des Forces Magnetiques, par M. Prevoſt.

Sur les Aimants artificielles par Rivoir. Paris, 1752.

Diſſertatio de Magnetiſmo, par Sam. Klingenſtiern et Jo. Brander. Holm. 1752.

Deſcription des Courants Magnetiques. Straſbourg, 1753.

Traité de l'Aimant, par Dalancé. Amſt. 1687.

Beſides the above original works, there are ſeveral valuable diſſertations on magnetiſm by Des Cartes, Bernoulli, Euler, Du Tour, Coulomb, &c. either publiſhed in the miſcellaneous works of theſe authors, or in the journals and tranſactions of academies.

We ſhall divide this article into three chapters. In the firſt we ſhall briefly deſcribe the principal inſtruments made uſe of in magnetical experiments; in the ſecond we ſhall endeavour to arrange under diſtinct heads or propoſitions, the leading principles of magnetiſm, point out how theſe may be illuſtrated by experiment, and explain the conſtruction and uſes of the magnetical apparatus, as they are deducible from the principles laid down; and in the third we ſhall notice the more important theories of magnetiſm, and exemplify the illuſtration of ſome of the preceding facts by that theory which we ſhall feel moſt diſpoſed to adopt.

CHAP. I. *Of Magnetical Apparatus.*

11 Magnetical inſtruments. THE principal inſtruments employed in magnetical experiments and obſervations, are reducible to three heads: Firſt, *Magnets* of various kinds and forms; Secondly, *Magnetic needles* and *compaſſes*; and, Thirdly, the *Dipping needle*. Of compaſſes we have nothing to ſay here, having fully treated of them under COMPASS.

12 Magnets. Magnets, as we have ſaid, are either *natural* or *artificial*. The natural magnet may be cut into various forms, according to the experiments that are to be made with it. The moſt uſual ſhape is oblong, having the poles at the two moſt diſtant extremities. Dr Gilbert, whom we ſhall mention more at large hereafter, made his magnets of a ſpherical ſhape, ſo as to reſemble the terreſtrial globe. Magnets of this ſhape are called *terrellæ*, or *little earths*, and have uſually marked upon their ſurface the magnetic poles, meridian, and equator.

13 Armature of magnets. Natural magnets of an oblong ſhape have uſually a piece of ſoft iron attached to each pole, called the *conductor*; and another piece of ſoft iron placed ſo as to join two of the extremities of the former pieces, and uſually furniſhed with a hook or hole in the middle. The magnet thus fitted up, as repreſented at fig. 1. is ſaid to be *armed*, and the iron pieces CD, CD, are called the *armature* of the magnet AB. The magnet with its armature is commonly incloſed in a braſs box, repreſented in the figure by the dotted lines DC, CC, CD; and to the upper part of the box is fixed a ring E, for holding the magnet.

Plate CCXCVIII.

One of the moſt common forms of the artificial magnet is that of an oblong bar, as NS, fig. 2. of which N is the north pole, and S the ſouth, having the north end marked with a tranſverſe notch. Theſe bars are made of hardened ſteel, and are either ſold ſeparately, or what is more common, in ſets of ſix in a box.

Another very common form of the artificial magnet is

Experimental Illuſtrations.

is that of a horſe ſhoe, ſuch as fig. 3. having the two poles N, S, brought near each other, and commonly united by a piece of ſoft iron or conductor. The horſe-ſhoe magnets ſometimes conſiſt only of a ſingle crooked bar; but they are frequently compoſed of ſeveral ſuch bars united together by their flat ſurfaces, and incloſed in a leathern covering that envelopes all but the poles, and thus preſerves the bars from ruſting.

Inſtead of the very arched form of which horſe-ſhoe magnets are uſually made, they are ſometimes contracted ſo as to form nearly a ſemicircle, and in this ſhape they are very convenient for ſeveral experiments.

Artificial magnets, like the natural, when of an oblong ſhape, are ſometimes armed at each end, ſo as to enable them to apply both poles to a ferruginous body at the ſame time. One material advantage of the horſeſhoe magnet is, that in it ſuch an armature is unneceſſary, as the poles are brought ſo near each other as eaſily to be applied to the object it is propoſed to lift, as a key, &c.

14 Magnetic needle. A *magnetic needle* is an oblong piece of ſteel, tempered ſo as commonly to aſſume the blue tinge that is ſeen in watch-ſprings, and ſupported on a braſs point, ſo as, when left at liberty, to arrange itſelf in the magnetic meridian, but in a horizontal poſition. Theſe needles are ſometimes made pointed at both extremities; ſometimes the northern extremity is made in the form of a croſs; but perhaps the beſt form is that of the oblong, with extremities that are nearly obtuſe, ſuch as is repreſented at fig. 4. To balance the needle on its pivot, it is furniſhed near its middle with a hollow cap, which is formed of ſome ſubſtance that is not attracted by the magnet. The cap is uſually of braſs; but for nice experiments it is ſometimes made of agate, as this latter does not wear ſo faſt as braſs, and conſequently the needle will longer retain its original ſuſpenſion.

15 Dipping needle. The *dipping needle*, fig. 5. conſiſts of an oblong bar of ſteel, AB, balanced between two horizontal ſlips of braſs, CD, CD, ſo as when magnetiſed to form an angle with the horizon, equal to the dipping of the needle at the place where the inſtrument is made. The two horizontal ſlips of braſs are either fixed to a graduated ſemicircle that is ſupported on a ſtand of wood, or more commonly they form diameters to a braſs ring which is graduated on its circumference, and furniſhed with a ring H, by which it may be held on the finger.

The conſtruction and uſes of theſe inſtruments will be fully explained in the next chapter; our only object here being to bring the reader acquainted with the names and general form of the inſtruments that are made uſe of in the experiments which we are about to deſcribe, for illuſtrating the principles of magnetiſm.

Several ſmaller articles will be required by the experimentaliſt; but theſe are eaſily procured, and need no particular deſcription. Such are a number of ſewing needles of various ſizes, ſoft iron bars, pieces of iron wire, ſmall iron balls, iron filings, &c.

CHAP. II. *Experimental Illuſtrations of the Principles of Magnetiſm.*

SECT. I. *Of Magnetical Polarity.*

WE have ſtated (N° 3.) that when a magnet is ſuſpended at perfect freedom, it aſſumes a certain determinate poſition with reſpect to the aſtronomical meridian. This is but a particular caſe of a much more general fact, which may be expreſſed by the following *propoſition.*

16 [illegible] ſition.

If *an oblong piece of iron be ſo adjuſted, as to be at liberty to take any poſition; it will aſſume a certain determinate direction with reſpect to the axis of the earth, differing according to the place where the experiment is made.*

Experiment 1.—Take a moderately ſized ſtraight iron rod, as a piece of iron wire about the thickneſs of a gooſe quill, and about eight or ten inches long; paſs it through one extremity of a large wine cork, ſo that it may be at right angles to the axis of the cork, and adjuſt it in ſuch a manner that it may ſwim in water in a horizontal poſition. Now, provide a pretty large earthen veſſel, as a hand baſon or round deep diſh, nearly filled with water; and when the water is free from agitation, cautiouſly put in the wire, in ſuch a direction as not to be very far from the north and ſouth line. The iron rod will, after ſome time, be found to have arranged itſelf ſo as, in Britain, to form an angle with the meridian of about 25 degrees.

This experiment requires ſome nicety, and it will ſometimes be long before the iron aſſumes its proper poſition; but if due attention be paid to all the particulars above mentioned, it will at length arrange itſelf in the magnetic line. It is neceſſary that the rod ſhould be placed not too far from the magnetic line, as if it be laid at right angles to that line, it will never acquire the proper direction. The ſituation of the rod in this experiment is in the true magnetic line, ſo far as reſpects the meridian; but, as it is horizontal, it is not in the poſition that a magnet would aſſume, if freely ſuſpended by its centre of gravity. An iron rod may, however, be made to take ſuch a poſition, as well as a magnet.

Exper. 2.—Inſtead of paſſing the iron rod through the extremity of a cylindrical or conical piece of cork, let it be paſſed through the centre of a ſpherical piece of cork or wood, ſo that the centre of gravity may coincide with the centre of the ſphere, and let the whole be of ſuch a ſpecific gravity as to remain ſuſpended in any part of the water, without aſcending or deſcending. If the iron rod thus fitted be placed as in the laſt experiment, it will at length arrange itſelf in the true magnetic direction, ſo as to make an angle of about 25 degrees with the meridian, and with one extremity depreſſed below the horizon at an angle of about 73 degrees.

17 Polarity of iron temporary. Theſe experiments were contrived by Dr Gilbert, and fully ſhew that the property of aſſuming a determinate direction with reſpect to the earth's axis is not confined to magnets, or iron rendered magnetical by the uſual proceſſes. There is, however, a remarkable difference between the polarity of unmagnetiſed iron and that of natural and artificial magnets. It is of no conſequence in the former which extremity be placed towards the north, or which below the ſurface of the water, as either will retain the poſition it firſt acquired, unleſs diſturbed by agitation, or by the proximity of a magnet; and both extremities may eaſily be made to change ſituations. *The effect produced on the iron is therefore temporary.* But if a magnetic needle be

freely ſuſpended, the ſame extremity always points towards the north, and this northern extremity always dips below the horizon, at leaſt in theſe northern latitudes; and if the poſition of the needle be diſturbed by mechanical motion, or by the application of a magnet, it will be reſumed when the diſturbing cauſe is removed. *The power of magnets therefore is permanent.*

13
Of magnets permanent.

14
Declination varies.

We have ſaid that the magnetic line varies at different times, and in different places. The declination of the magnet is ſo uncertain as to impoſe great impediments to the art of navigation, as it is neceſſary, in the courſe of a long voyage, frequently to aſcertain the degree of variation for any particular time or place. The method of doing this is mentioned under Compass. The declination obſerved in different places at different times, has been laid down in tables; and as ſuch tables are very uſeful, we ſhall here ſubjoin one, given by Mr Cavallo.

Latitude.	*Longitude.*	*Declination.*	*Years in which the obſervations were made.*
North.	Weſt.	Eaſt.	
70° 17′	163° 24′	30° 21′	1779
69 38	164 11	31 0	1778
66 36	167 55	27 50	
65 43	170 34	27 58	
63 58	165 48	26 25	
59 39	149 8	22 54	
58 14	139 19	24 40	
55 12	135 0	23 29	
53 37	134 53	20 32	
		Weſt.	
50 8	4 40	20 36	1776
48 44	5 0	22 38	
40 41	11 10	22 27	
33 45	14 50	18 7	
31 8	15 30	17 43	
28 30	17 0	14 0	
23 54	18 20	15 4	
20 30	20 3	14 35	
19 45	20 39	13 11	
16 37	22 50	10 33	
15 25	23 36	9 15	
13 32	23 45	9 25	
12 21	23 54	9 48	
11 51	24 5	8 19	
8 55	22 50	8 58	
6 29	20 5	9 44	
4 23	21 2	9 1	
3 45	22 34	8 27	
2 40	24 10	7 42	
1 14	26 2	5 35	
0 51	27 10	4 59	
0 7	27 0	4 27	
South.			
1 13	28 58	3 12	
2 48	29 37	2 52	
3 37	30 14	2 14	
4 22	30 29	2 54	
5 0	31 40	1 26	
South.	Weſt.	Weſt.	
6° 0′	32° 50′	0° 6′	1776
		Eaſt.	
6 45	33 30	0 35	
		Weſt.	
7 50	34 20	0 7	
8 43	34 20	0 15	
		Eaſt.	
9 1	34 50	0 44	
		Weſt.	
10 4	34 49	0 38	
		Eaſt.	
12 40	34 49	1 12	
13 23	34 49	1 1	
14 11	34 49	1 9	
15 33	34 40	1 15	
16 12	35 20	2 4	
18 30	35 50	3 2	
20 8	36 1	5 26	
21 37	36 9	3 24	
24 17	36 8	3 24	
26 47	34 27	3 44	
28 19	32 20	1 58	
30 25	26 28	2 37	
		Weſt.	
33 43	16 30	4 44	
35 37	9 30	5 51	
38 52	23 20	22 12	
	Eaſt.	Eaſt.	
40 36	173 34	13 47	
42 4	167 32	13 17	
		Weſt.	
44 52	155 47	9 28	
46 15	144 50	14 48	
48 41	69 10	27 39	

It is of ſtill more importance to know the progreſſive change of the declination at any certain place, and we ſhall therefore give here the following table of the declination as obſerved at London in different years, from 1576 to 1800.

Years.	*Declination.*	*Obſervers.*
	Eaſt.	
1576	11° 15′	Burrowes.
1580	11 11	
1612	6 10	
1622	6 0	Gunter.
1633	4 6	
1634	4 5	Gellibrand.
	Weſt.	
1656	0 0	Bond.
1665	1 $22\frac{1}{2}$	Gellibrand.
1666	1 $35\frac{1}{2}$	
1672	2 30	Halley.

Years.	*Declination.*	*Obſervers.*
	Weſt.	
1683	4 30	
1692	6 0	
1700	8 0	
1717	10 42	
1723	14 17	
1748	17 40	Graham.
1760	19 12	
1765	20 0	
1770	20 35	
1773	21 9	Heberden.
1775	21 30	
1780	22 10	
1785	22 50	
1787	23 19	Gilpin.
1790	23 34	
1795	23 57	Gilpin.
1800	24 7	
1802	24 6	Gilpin.
1805	24 8	

From this laſt table it appears that when the declination was firſt obſerved, the north pole of the magnetic needle declined to the eaſtward of the meridian of London, that ſince that time it advanced continually towards the weſt till 1657, when the needle pointed due north and ſouth, and that ever ſince it has continually declined more and more towards the weſt, in which direction it appears to be ſtill advancing.

At Paris, in different years, the declination has been obſerved as follows :

In 1550	-	8°	0′ Eaſt.
1640	-	3	0
1660	-	0	0
1681	-	2	2 Weſt.
1759	-	18	10
1760	-	18	20

From 1792 to 1794		21°	54′ Stationary.
In 1798	-	22	17
1799	-	22	0
1800	-	22	12
1801	-	22	1
1802	-	21	45
1803	-	21	59
1804	-	22	10
At Jamaica 1805	-	6	30 E.

At Alexandria in Egypt.

In 1761	-	11°	4′ W.
1798	-	13	6

At Cairo,

In 1761	-	12°	25 W.
1798	-	12	

The declination of the magnetic needle has been found to be different, even at different hours of the day. The following table contains the reſult of ſome obſervations made by Mr Canton on the daily variation, and, on the mean variation of each month.

The declination obſerved at different hours of the ſame day. June 27. 1759.

	H. Min.	Decl. W.	Degrees of the Therm.	The mean Variation for each Month in the Year.	
Morning.	0 18	12° 2	62°	January,	7′ 8″
	6 4	18 58	62	February,	8 52
	8 30	18 55	65	March,	11 17
	9 2	18 54	67	April,	12 26
	10 20	18 57	69	May,	13 0
	11 40	19 4	68½	June,	13 21
Afternoon.	0 50	19 9	70	July,	13 14
	1 38	19 8	70	Auguſt,	12 19
	3 10	19 8	68	September,	11 43
	7 20	18 59	61	October,	10 36
	9 12	19 6	59	Nobember,	8 9
	11 40	18 51	57½	December,	6 58

Table of the Mean Monthly Variation of the Magnetic Needle for 20 Years at London *.

Years.	January.	February.	March.	April.	May.	June.	July.	Auguſt.	Septemb.	October	Novemb.	Decemb.
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
1786	-	-	-	-	-	-	-	-	23 16.4	23 18.4	23 17.3	23 18.3
1787	23 19.2	23 19.8	23 20.3	23 18.5	23 17.0	23 18.3	23 19.6	23 21.9	23 22.8	23 24.5	23 25.0	23 25.8
1788	23 25.6	-	-	-	-	23 28.9	23 29.8	-	-	23 32.1	-	-
1789	-	-	-	-	-	23 34.2	-	-	-	-	-	23 41.2
1790	23 38.9	-	-	-	-	-	23 39.0	-	-	-	-	-
1791	23 35.6	-	-	23 36.0	-	-	23 36.7	-	-	-	-	-
1792	23 41.1	-	-	-	23 41.9	-	-	23 43.6	23 43.9	23 45.6	23 45.9	23 45.2
1793	23 46.9	23 48.3	23 48.8	23 46.2	23 47.3	23 48.5	23 50.5	23 48.6	23 52.6	23 52.3	23 51.9	23 52.3
1794	23 54.2	-	-	-	-	-	23 54.4	23 57.2	23 58.1	-	-	-
1795	-	-	23 57.5	-	-	23 57.1	23 57.1	-	24 0.4	-	-	23 59.4
1796	-	-	24 1.1	-	-	23 58.7	23 59.2	-	24 0.1	-	-	24 1.3
1797	-	-	24 1.5	-	-	24 0.2	24 0.3	-	24 1.4	-	-	24 1.3
1798	-	-	24 0.6	-	-	23 59.4	24 0.0	-	24 1.4	-	-	24 1.4
1799	-	-	24 1.1	-	-	24 0.6	24 1.8	-	24 2.9	-	-	24 2.3
1800	-	-	24 3.6	-	-	24 1.8	24 3.0	-	24 3.6	-	-	24 3.3
1801	-	-	24 5.2	-	-	24 2.8	24 4.1	-	24 3.8	-	-	24 5.4
1802	-	-	24 6.9	-	-	24 5.3	24 6.0	-	24 8.7	-	-	24 6.8
1803	-	-	24 8.0		-	24 7.0	24 7.9	-	24 10.5	-	-	24 10.7
1804	-	-	24 9.4	-	-	24 6.0	24 8.4	-	24 8.9	-	-	24 9.0
1805	-	-	24 8.7	-	-	24 7.8	24 7.8	-	24 10.0	-	-	24 9.4

Charts

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* Phil. Tranſ. 1806. p. 416.

Experimental Illuſtrations.

Charts have been conſtructed for ſhewing the declination of the needle in various parts of the earth by means of curve lines. Reſpecting theſe charts and ſeveral other circumſtances with regard to this ſubject, ſee Variation *of the Compaſs*.

It may not be improper here to point out the general method of applying the polarity of the magnet to the uſeful purpoſes of navigation, mining, &c.

A mariner's compaſs, or magnetic needle in a caſe, is ſo placed as to be as little as poſſible diſturbed by the motion of the veſſel, perſon, &c. In a ſhip, it is placed in the binnacle (ſee Binnacle), or ſuſpended from the upper deck in the cabin. Then the head of the veſſel is kept by the helm in ſuch a direction as to make any required angle with the line of the needle, or the perſon (in mining or travelling) advances in a ſimilar manner. Thus, ſuppoſing that a veſſel ſets out from a certain part, in order to go to another place that is exactly weſtward of the former; as for example, from the Land's End in Cornwall to Newfoundland on the coaſt of North America. The veſſel muſt be directed in ſuch a way, as that its courſe may be always at right angles with the direction of the magnetic needle, or ſo that the part of the needle or compaſs card, which points to the northward, (allowing for the variation) may be always kept to the right hand of the man at the helm, or to the ſtarboard ſide of the veſſel. The reaſon of this is evident; for, ſuppoſing the needle to point duly north and ſouth, the direction of eaſt and weſt being perpendicular to it, this muſt be the true courſe of the veſſel. From this example, a little reflection well eaſily point out how a veſſel may be ſteered in any other courſe (A.)

20 Polarity diſturbed by the approach of iron.

The declination of the magnetic needle is diſturbed by the near approach of a ferruginous body, eſpecially if this be of conſiderable ſize.

On holding the extremity of a pretty large iron rod, ſuch as a poker, near one end of a magnetic needle properly ſuſpended, the needle will be found to turn conſiderably from its uſual direction. This circumſtance, though proper to be mentioned here, will be better underſtood when we have conſidered the attractive power of the magnet. The fact is uſeful, as it teaches us to keep magnetic needles in ſuch a ſituation as not to be acted on by any conſiderable body of iron.

A magnet, whether natural or artificial, has a greater effect in diſturbing the polarity of a magnetic needle than is produced by iron.

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Magnetic polarity ſeems alſo to be affected by changes in the ſtate of the atmoſphere; and the following axioms reſpecting this effect on the declination of the needle, collected by M. la Cotte, are deſerving of attention.

1. The greateſt declination of the needle from the north towards the weſt, takes place about two in the afternoon; and the greateſt approximation of it towards the north, about eight in the morning; ſo that from the laſt mentioned hour till about two in the afternoon, it endeavours to remove from the north, and between two in the afternoon and the next morning, to approach it.

2. The annual progreſs of the magnetic needle is as follows:—Between January and March, it removes from the north; between March and May it approaches it; in June it is ſtationary; in July it removes from it; in Auguſt, September, and October it approaches it; its declination in October is the ſame as in May; in November and December it removes from the north; its greateſt weſtern declination is at the vernal equinox, and its greateſt approximation to the north, at the autumnal equinox.

3. The declination of the magnetic needle is different, according to the latitude; among us, (i. e. in France) it has always increaſed ſince 1657; before that period it was eaſterly.

4. Before volcanic eruptions and earthquakes, the magnetic needle is often ſubject to very extraordinary movements.

5. The magnetic needle is agitated before and after the appearance of the northern lights: its declination on theſe occaſions is about noon greater than uſual.

21 So much has already been ſaid reſpecting the phenomena, &c. of the dipping needle, under the article *Dipping Needle*, that it is unneceſſary here to add much more on the ſubject. It was there noticed, that at the equator the dipping needle lies quite horizontal, and that one of its extremities inclines more towards the earth, according as the inſtrument is carried farther from the equator. We may here add, that from ſome late obſervations made by experimentaliſts with balloons, it appears that the higher we aſcend above the ſurface

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(A) In reply to ſome inquiries reſpecting the mode of employing the compaſs in mining, we were favoured by an ingenious friend, who is manager of one of the moſt extenſive coalworks in this iſland, with the following remarks: "The compaſs is uſed in all mines where great accuracy is required. In ſome coal-mines the *cleats* or *faces* of the coal are the guides to the miners in excavating the mine, and the compaſs is uſed to aſcertain the ſituation and extent of the excavations. In other coal-mines the courſes of the excavations are at firſt directed by the compaſs. In doing this, the compaſs is placed in a given ſituation, and is made to point the deſired courſe. Then from the centre of one ſight a perpendicular line is conveyed to the roof of the mine, and a ſmall mark is there made with chalk: then a perſon looks at a candle (placed ſo as nearly to touch the roof), through the lower part of the ſight of the compaſs neareſt to him, and through the upper part of the oppoſite ſight. The candle at the roof is moved in any direction until he ſees it through both ſights of the compaſs. It is then in a proper place, and a chalk mark is made in the roof immediately above it. A line ſtruck with a chalked cord, between theſe two marks upon the roof, marks the proper courſe, by which the workmen are directed in making the excavation. By applying one part of a chalked cord along part of the courſe or white line thus begun on the roof, and extending the other part of the cord paſt it to any required diſtance, and then ſtriking the cord, the courſe may be continued from time to time as the excavation advances."

Experiments and Illustrations.

furface of the earth, the lefs is the angle of inclination which the dipping needle makes with the horizontal line *.

It is worthy of remark that, under the fame circumftances, the declination of the needle was not found different from what it would have been on the earth at the fame place, and its polarity with refpect to iron was unchanged.

In an aëroftatic voyage made at St Peterfburgh in 1804 by M. M. Sacharof and Robertfon, it was obferved that the *fouth* pole of a magnetic needle, balanced on a pin, dipped below the horizon nearly 10 degrees.

The following table fhows the magnetic dip as obferved at feveral different places at various times.

Latitude.	*Longitude.*	*N. Pole below the Horizon.*	*Years of Obfervation.*	*Latitude.*	*Longitude.*	*N. Pole below the Horizon.*	*Years of Obfervation.*
North.	Eaft.			South.			
53° 55′	193° 39	69° 10′	1778	0° 3′	27° 38′	30° 3′	
49 36	233 10	72 29		4 40	30 34	22 15	
	Weft.			7 3	33 21	17 57	
44 5	8 10	71 34	1776	11 25	34 24	9 15	
38 53	12 1	70 30			Eaft.	*S. Pole below.*	
34 57	14 8	66 12		16 45	208 12	29 28	
29 18	16 7	62 17		19 28	204 11	41 0	
24 24	18 11	59 0		21 8	185 0	39 1	1777
20 47	19 36	56 15		35 55	18 20	45 37	1774
15 8	23 38	51 0		41 5	174 13	63 49	1777
12 1	23 35	48 25		45 47	166 18	70 5	1773
10 0	22 52	44 12		Prince of Wales's Ifland.		5 10	1799
5 2	20 10	37 25					

*Table of the Magnetic Dip at London, from 1786 to 1805.**

			Poles Reverfed.		
	Face eaft.	Face weft.	Face eaft.	Face weft.	True dip.
1786 September	72 28,7	72 1,4	71 57,3	72 5,1	72 8.1
October	72 29,9	71 59,0	72 0,4	72 1,2	72 7,6
November	72 7,6	72 17,6	72 2,4	71 46,7	72 3.6
December	72 10,6	72 2,2	72 2,2	71 58,4	72 3,4
1787 January	72 11,4	72 1,8	72 1,0	71 56,0	72 2,5
February	72 19,4	72 10,8	72 1,5	71 55,8	72 6,9
March	72 19,1	72 11,9	72 0,5	71 52,2	72 5.9
April	72 24,4	72 9,5	72 0,5	71 52,2	72 6.6
May	72 24,4	72 9,6	72 4,2	71 52,9	72 7,8
June	72 22,6	72 7.9	72 4,2	71 52,9	72 6,8
July	72 22,6	72 7,9	71 59,9	71 55.1	72 6.4
Auguft	72 22,3	72 6,7	72 59,3	71 55.2	72 5,9
September	72 22,3	72 6.7	72 2.9	71 51,0	72 5.7
October	72 23,1	72 2,5	72 2,9	71 51.0	72 4.9
November	72 23.1	72 2,5	72 2,7	71 50.3	72 4.7
December	72 22,8	72 2,0	72 2,7	71 50,3	72 4.4
1788 January	72 22,8	72 2,0	72 2.6	71 48,8	72 4.0
1789 January	72 16,0	72 0,0	71 51.9	71 31.1	71 5[illegible].8
December	72 17,5	71 59 4	71 38,9	71 42.8	71 54.6
1790 January	72 16,9	71 57,7	71 40,2	71 40,2	71 53,7
1791 January	71 43,9	71 36,1	71 37,2	71 17,5	71 23.7
1795 October	71 12,8	71 9,5	71 13.9	71 9.4	71 11.4
1797 October	71 4.9	71 10.9	70 56,3	70 44.7	70 59,2
1798 April	71 4,7	71 14.5	71 2,3	70 19.8	70 55.4
October	70 55,6	71 14.5	71 7.7	70 22,2	70 55.0
1799 October	70 56,0	71 13.5	71 11.5	70 7.9	70 52,2
1801 April	70 47.4	71 5,6	70 52,4	69 38,2	70 35.6
1803 October	70 30,9	71 9,9	70 40,5	69 46,7	70 32,0
1805 Auguft	70 25,2	70 55,7	70 2[illegible].9	69 36.3	70 21 0

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* [illegible]

* Phil. Tranf. 1806. p. 41[illegible]

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To what was ſaid under *Dipping Needle*, reſpecting the conſtruction of that inſtrument, we may add, that, notwithſtanding the great improvements that have been lately made in the arts, the making of a dipping needle is one of the moſt delicate and difficult taſks that an inſtrument-maker can undertake. The needle muſt be made of tempered ſteel which we are certain has no magnetiſm before it is touched; it muſt be poiſed ſo nicely, and with ſuch a perfect coincidence of its centre of gravity and axis of motion, that it will retain any poſition (before being magnetiſed) that is given it. A good dipping needle cannot be had below *twenty guineas*.

Sect. II. *On Magnetic Attraction and Repulſion.*

21
A magnet attracts iron and all ferruginous bodies.

A magnet attracts iron, and all bodies, into the compoſition of which iron enters in any conſiderable degree. This principle is illuſtrated by very ſimple experiments, which will readily occur to every reader. It is of conſequence here to obſerve, that the purer and ſofter the iron to which the magnet is preſented, the ſtronger will be the attraction; thus, a magnet attracts a piece of ſoft and clean iron much more ſtrongly than it attracts any other ferruginous body of the ſame ſhape and weight. Hard ſteel, or the harder ores of iron, are leſs forcibly attracted than ſoft ſteel, and ſtill leſs than ſoft iron; and all pieces of iron are leſs forcibly attracted in proportion as they are more oxygenated.

22
Attraction greateſt at the poles.

The attractive power of a magnet is not equally ſtrong on every part of its ſurface. It is moſt powerful at the poles of the magnet, and it is found to diminiſh in proportion as the part of the ſurface is more diſtant from the poles. Thus, in an oblong magnet, the attraction is leaſt at about its middle, where it is often very trifling.

23
Method of finding the poles of a magnet.

It is by this property of the magnet that we are enabled to diſcover the poles of a magnet, where they are not yet aſcertained; a circumſtance which is often neceſſary with reſpect to natural magnets, in which, when of an irregular ſhape, it would otherwiſe be difficult to diſcover the poles. The uſual method of aſcertaining the poles of a magnetic body is, to preſent various parts of the body to be examined, ſucceſſively to the poles of a magnetic needle, when it will ſoon be diſcovered which parts of the body have moſt influence on the needle, by the pole of the latter ſtanding perpendicularly to that part of the body. It will preſently appear, that in this way it may alſo be aſcertained which of theſe poles is the north, and which the ſouth, as the ſouth pole of the body under examination will have moſt influence on the north pole of the needle, and *vice verſa*.

A good magnet ſhould have no more than two poles, and theſe ſhould be ſituated in the extreme ſurface of the magnet; but it ſometimes happens, eſpecially in natural magnets, and in artificial magnetic bars, if they be very long, that there are more than two poles, or that the poles are very confuſed. For example, in a very long magnetiſed bar, there may be a ſtrong north pole at one extremity, a ſouth pole a little farther on, then a weaker north pole, and ſo on to the extremity, which will be found poſſeſſed of a ſtill weaker ſouth polarity. Theſe poles are to be diſcovered by preſenting to the ſeveral parts of the bar one or other of the poles of a magnetic needle; for, as we ſhall immediately mention, each pole of the needle will be attracted towards that part of the rod which is poſſeſſed of the contrary polarity.

The attractive power of the magnet and the iron is moſt forcible when the two bodies are in contact, and it diminiſhes as they are made to recede from each other. The exact law according to which this diminution takes place, has not yet been completely aſcertained. We ſhall ſee in the next chapter, what approximation has been made to it.

24
Different attractive power of magnets.

A magnet is not capable of lifting above a certain weight of iron; and all magnets of the ſame form and ſize are not able to lift the ſame weight. Among the natural magnets the ſmalleſt ſeem in general to poſſeſs a greater attractive power in proportion to their ſize, than thoſe of larger dimenſions. Mr Cavallo mentions a ſmall magnet that weighed not more than 6 or 7 grains, and was capable of lifting about 300 grains; and Sir Iſaac Newton poſſeſſed a magnet that he wore in a ring, weighing but about 3 grains, which is ſaid to have lifted 746 grains, or nearly 250 times its own weight. The larger natural magnets are very weak in proportion to theſe. Thoſe of two pounds ſcarcely lift more than ten times their own weight. It ſeems extraordinary, that a piece cut off from a large magnet is ſometimes much ſtronger in reſpect of its attractive power, than the magnet from which it was taken.

It has been ſaid that the attractive power of magnets is greateſt at their poles. Both poles, however, are ſeldom equal in this reſpect; and it appears, that in theſe northern parts of the world, the north pole of magnets is more powerful than the ſouth. In the ſouthern hemiſphere the contrary effect is ſaid to take place. The attractive power of the magnet is moſt forcible when both poles are made to act conjointly; hence an armed magnet, or one of the horſe-ſhoe form, is beſt adapted for experiments on the force of magnetic attraction.

25
It is of little conſequence whether the iron that is preſented to the magnet be in one piece, or conſiſt of ſeveral pieces. The attraction is indeed ſtronger in the former caſe; but if ſeveral pieces of iron are preſented to the magnet, they will either all adhere about the pole of the magnet, or will adhere to each other, ſo as to form a ſort of chain. If a ſmall iron ball be made to adhere to the pole of a magnet, this ball will ſupport a ſecond; and this latter, if the magnet be pretty ſtrong, will ſupport a third. If the magnet be of the horſe-ſhoe form, and have theſe three balls hanging by one ball, if two others be ſuſpended from the other pole, all the five may be made to adhere, ſo as to form a curved chain. It will be evident, that pieces of iron which preſent a greater extent of ſurface than the above ſpherical balls, will be more powerfully attracted.

26
Action of a magnet on iron filings.

One of the moſt pleaſing experiments on the attraction of the magnet for iron, is ſhewn by means of iron filings.

Exper.—Let a paper be placed above a bar magnet, and let iron filings be ſhaken on the paper through a gauſe ſieve. They will arrange themſelves round the magnet in a very beautiful manner, forming curves and arches of curves, as repreſented in fig. 6. At the two ends of the magnet, as *a a*, there are chains of filings ſtanding out nearly perpendicular; and along the ſides they

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they form complete curves, bending outwards away from the magnet towards its middle, and having their extremities bounded by the poles of the magnet; and at the corners there are a number of arches that ſeem to form imperfect curves.

A ſimilar effect may be produced by ſtrewing iron filings on a piece of paper, ſo as to leave a vacancy in the middle, capable of receiving a bar magnet. When the magnet is placed on the paper, and the paper gently tapped, ſo as to agitate the filings, theſe will arrange themſelves about the magnet, in curves, as above deſcribed.

The form of theſe curves will be better defined if the magnet be laid at the bottom of an earthen or glaſs veſſel of water, and the iron filings be ſifted over it ſo as to paſs through the water.

27 [illegible]

The attraction between a magnet and a ferruginous body is mutual.

Exper.—Place a piece of iron or other ferruginous body upon a piece of cork or wood, ſo that it may float on the ſurface of water in an earthen or wooden veſſel. Bring a magnet within a moderate diſtance of the floating body, and the latter will approach the former, and may be drawn by it in any direction. Again, place the magnet on cork or wood, ſo as to float on the water, and preſent to it a piece of iron, or other ferruginous body. The magnet will now approach the iron, and may be drawn by it as the iron was before. Laſtly, Place both the magnet and the iron on ſeparate pieces of wood or cork, within a moderate diſtance of each other, on the ſurface of the water. They will gradually approach each other, with a velocity that becomes greater in proportion as they approach nearer each other.

28 Magnetic attraction not leſſened by the interpoſition of bodies not ferruginous.

Magnetic attraction is not ſenſibly impeded by the interpoſition of bodies of any kind, that do not contain iron in their compoſition.

Exper.—Suppoſe that a magnet, placed at the diſtance of an inch from a piece of iron, exerts a certain degree of attraction, it will be found that the attraction is not ſenſibly weakened by the interpoſition of a plate of glaſs, a ſheet of paper, a piece of copper, or any other ſimilar ſubſtance. A needle, incloſed in a glaſs globe, will be ſtill attracted by the magnet.

29 Uſual mode of meaſuring the attractive force.

It is not eaſy to aſcertain correctly the degree of attractive force exerted between a magnet and a ferruginous body. The uſual method of obſerving this is, to faſten a magnet to one arm of a balance, and placing the body to be attracted at different diſtances below the magnet, to counterpoiſe the attraction with weights placed in the oppoſite ſcale of the balance. Proceeding in this way, then, if we find that it requires the weight of an ounce to counterpoiſe the attractive power of a magnet, when preſented immediately to a piece of iron, it will be found that it requires the ſame counterpoiſe, if a plate of any matter that is not ferruginous be interpoſed.

30 Iron attracts iron in certain ſituations.

Not only is iron attracted by the magnet, but *under certain circumſtances, one piece of iron exerts an attractive power on another piece of iron.*

Exper.—Let an oblong piece of iron be fixed in a ſpherical piece of wood or cork, ſo as to float in water in the true magnetic line, as in Exper. 2. of N° 16. When the iron is nearly in the magnetical poſition, bring the extremity of a large iron rod, as the point of a new poker, holding it in a poſition not very different from that of the iron wire, within about a quarter of an inch of the upper extremity of the floating iron, and hold it there for ſome time, a little towards one ſide. The floating wire will gradually approach the iron rod with an accelerated motion, will at length touch it, and may be drawn through the water in any direction. A ſimilar attraction will take place between the head of the poker and the extremity of the wire that is below the water.

31 Magnetic attraction increaſed by iron.

The attractive power of the magnet is increaſed by the near approach of a piece of iron.

Exper. 1.—Suppoſe we have a magnetic bar that is capable of ſupporting a ſmall key by one of its extremities, but which will not lift a key ſomewhat larger. If we bring a conſiderable oblong piece of iron near the oppoſite extremity of the bar, it will be found capable of ſupporting the larger key, or at leaſt of lifting a weight ſomewhat greater than it lifted before.

Exper. 2.—Let an oblong magnetic bar be ſupported in a horizontal poſition, and let a piece of iron wire, about an inch in length, be hung by a ſhort thread, ſo that its extremity is juſt oppoſite one of the poles of the magnetic bar, but ſo far out of the reach of the bar's attractive power as not to be brought from the perpendicular. Now, if a conſiderable iron bar be brought with one end within a moderate diſtance of the oppoſite pole of the magnet, the ſuſpended wire will be drawn towards the magnet, thus ſhewing that the power of the latter has been increaſed by the juxtapoſition of the bar of iron. If the bar of iron be brought ſtill nearer the oppoſite pole of the magnet, the ſuſpended wire will be drawn ſtill nearer its adjacent pole; but if the bar of iron be drawn back from the magnet, the wire will fall into its original poſition.

This fact leads to many important practical concluſions in the management of magnets. As the juxtapoſition of iron to the *poles* of a magnet improves its powers, we may infer, that if we keep a piece of ſoft iron in contact with the poles, the magnet will be improved by it; and this is in fact the caſe, and it ſhows the utility of the armature and conductor mentioned in N° 13. But of this more hereafter.

Power of magnet increaſed by hanging weights to it.

The attractive power of a magnet may be improved by increaſing the weight appended to it.

This is beſt ſhown by a horſe-ſhoe magnet, having a conductor of ſoft iron attached to its two poles, and a braſs ring at the convex part by which it may be ſuſpended. If a ſmall bag be hung to the conductor, and if the magnet is capable of containing a certain weight at any particular time, it will, by adding a little more, ſuppoſe a few ſhot, to the bag, at moderate intervals, be made to ſupport gradually a much greater weight. If the magnet, on a firſt trial, was able to lift a ſmall key, it will ſoon be able to lift a larger one, &c. How far this increaſe of power may be carried, has not, we believe, yet been aſcertained.

It ſometimes happens that a magnet does not ſhow any great attractive power, as exemplified in its power of lifting a conſiderable weight of iron, though it may have a great effect in exciting or in altering magnetic polarity. This was obſerved by Dr Gilbert, who re-

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marks that the *directive* power of a magnet extends farther, than its *attractive* power.

33
Contrary poles of magnets attract each other.

The contrary poles of two magnets attract each other; that is, the north the south, and vice versa.

Exper. 1.—Place two oblong magnets on cork or wood, ſo as to float in water, or ſuſpend each by a pretty long thread, with the north pole of the one oppoſed to the ſouth pole of the other. They will gradually approach, and will at length ruſh together.

A ſimilar effect will be produced, if the north pole of a bar magnet be held near the ſouth pole of a magnetic needle; the latter will be attracted, and the ſame thing will happen if the ſouth pole of the bar is brought near the north pole of the needle.

Exper. 2.—Take two ſemicircular magnets, and dip their extremities into iron filings. The filings will of courſe adhere to the extremities of the magnets, and will appear as if radiating from them. Now, preſent the two magnets with their adhering filings to each other, ſo that the north and ſouth pole of the one is oppoſite to the contrary poles of the other, and the iron filings at their extremities will approach each other, and coaleſce, as repreſented in fig. 7.

The attraction exerted between two magnets is not ſo ſtrong in proportion, as between a magnet and a piece of ſoft iron in contact; but it has been found to commence at a greater diſtance.

34
Corresponding poles repel each other.

The correſponding poles of two magnets repel each other; that is, the north the north, and the ſouth the ſouth.

Exper. 1.—Make the two magnets float on water, or ſuſpend them by threads, ſo that the north or ſouth pole of the one may be oppoſite to the north or ſouth pole of the other. They will recede from each other, and the repulſion will evidently be greater, in proportion as they are brought nearer together.

Exper. 2.—Take two ſemicircular magnets, and dip their ends in iron filings, as mentioned above. Preſent them to each other, ſo that their correſponding poles may be mutually oppoſed. The filings at their extremities will ſtart back, and leave a vacancy between the oppoſed poles of the magnets, ſomewhat like what is repreſented in fig. 8.

It ſometimes happens that the correſponding poles of two magnets do not repel each other, but either mutually attract, or are quite indifferent. In this caſe, it will, in general, be found that one of them is ſtronger than the other; and the reaſon of the phenomenon will appear hereafter.

The repulſive power of a magnet is generally in a leſs proportion than its attractive power.

35
Method of ascertaining whether a body is magnetic.

It is by the attractive power of the magnet that we uſually aſcertain whether any ſubſtance be magnetic; that is, whether the magnet poſſeſs any attractive power for it. If the body contain any conſiderable quantity of iron in its compoſition, its magnetiſm is eaſily aſcertained, by approaching it with the pole of a pretty ſtrong magnetic bar. If, however, the magnetiſm is too feeble to be diſcovered in this way, it may be aſcertained by placing the body on a piece of cork or wood, ſo that it may float on the ſurface of water or mercury, in an earthen or wooden veſſel, and bringing the pole of the magnet within a ſmall diſtance of the floating body. It will ſometimes be neceſſary to bring the magnet within one-tenth of an inch of the body, when, if it poſſeſſes any magnetiſm, it will gradually approach the magnet. This experiment is moſt ſatisfactory when the body to be examined is made to float on mercury; but in that caſe the veſſel containing the mercury muſt not be too ſmall, otherwiſe the natural convexity of the ſurface of the mercury will cauſe the floating body perpetually to fall down towards the ſides of the veſſel. A common ſoup plate will anſwer the purpoſe very well. It is alſo neceſſary that the mercury be very pure, and as clean as poſſible. To inſure this, it will be proper, before uſing the mercury, to paſs it through a conical piece of writing paper, rolled up ſo as to terminate in a very ſmall aperture; or what is better, to ſqueeze it through a pretty thick piece of ſhamois leather. It need ſcarcely be remarked, that in theſe delicate experiments, the air of the room ſhould be kept as ſtill as poſſible.

By the above methods, Mr Cavallo and others diſcovered, that the following ſubſtances are in ſome meaſure affected by the magnet. Moſt metallic ores, eſpecially after their having been expoſed to a fire; zinc, biſmuth, and particularly cobalt, as well as their ores, are almoſt always attracted. Of the earths, the calcareous is the leaſt, if at all, and the ſiliceous is the moſt frequently, attracted. The ruby, the chryſolite and the tourmalin, are attracted. The emerald, and particularly the garnet, are not only attracted, but frequently acquire a permanent polarity. The opal is weakly attracted, eſpecially after combuſtion. Moſt animal and vegetable ſubſtances, after combuſtion, are attracted. Even ſoot, and the duſt which uſually falls upon whatever is left expoſed to the atmoſphere, are ſenſibly attracted by the magnet.

35
Coulomb's experiments on univerſal magnetiſm.

"It has long ago been remarked, that platina, nickel, and ſeveral other bodies, acquire a ſenſible degree of magnetiſm; but ſome philoſophers attribute this property only to a portion of iron not eaſy to be ſeparated, and conclude, that by obtaining a greater degree of purity, we might ſucceed in rendering them perfectly indifferent to the action of the magnetic bar.

"The new experiments which Citizen Coulomb has made and repeated before the inſtitute, lead us on the contrary to think, that the action of magnetiſm extends through all nature; for none of the bodies he has yet tried was found to reſiſt this power.

"But however real this action may be, it is not alike in all bodies, and in moſt of them it muſt be neceſſarily very ſmall, to have eſcaped the attention of philoſophers to this time. In order, therefore, to exhibit and to meaſure theſe reſults, we muſt begin by placing the bodies in a ſituation which ſhall allow them to yield to the weakeſt action.

"For this purpoſe, Citizen Coulomb faſhioned his ſubjects into the form of a cylinder or ſmall bar; and in this ſtate he ſuſpended them to a ſilken thread, ſuch as is drawn from the ſilk worm's cone, and in this ſtate he placed them between the oppoſite poles of two magnetic bars of ſteel. The ſingle thread of ſilk could hardly bear the weight of a quarter of an ounce without breaking, conſequently it became neceſſary to form ſmall bars very light and thin. Citizen Coulomb made them about ſeven or eight millimetres in length (or leſs than half an inch), with three-fourths of a millimetre

(or

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(or about an hundredth part of an inch) in thickneſs, and he gave the metals about one-third of this thickneſs.

" In his experiments he placed the ſteel bars in the ſame right line, their oppoſite poles being five or ſix millimetres farther aſunder than the length of the needle intended to oſcillate between them. The reſult of the experiment ſhewed, that whatever might be the ſubſtance of the needle, it always diſpoſed itſelf according to the direction of the two bars; and that if they were turned from this direction, they always recovered it, after oſcillations of which the number was often more than 30 per minute. It was therefore eaſy in every caſe to determine, from the weight and figure of the needle, the force which had produced the oſcillation.

" Theſe experiments were ſucceſsfully made with ſmall needles of gold, ſilver, copper, lead, tin, ſmall cylinders of glaſs, a piece of chalk, a fragment of bone, and different kinds of wood.

" Citizen Coulomb has proved, that the force of torſion of the ſilk thread is ſo ſlight, that in order to draw it round the entire circle, it would require a force ſcarcely equal to the one hundred thouſandth part of a gramm, (or about one ſeven hundredth part of a grain). A quantity ſo minute cannot therefore ſenſibly derange the meaſure of magnetic force in the different bodies; and its effect, even if it were admitted to be of perceptible magnitude, may alſo be urged in proof of the general concluſion of Citizen Coulomb, becauſe the magnetic power muſt overcome this reſiſtance of the thread in order to manifeſt itſelf. Our author gives, in the third volume of the Memoirs of Natural Philoſophy and Mathematics of the National Inſtitute, a very ſimple formula to determine the magnetic force of a body from the time of its oſcillations; and he means to ſhew in another memoir, the method of determining this reſult in different bodies of the ſame figure placed between the poles of two bars. He thinks it now proved, that all the elements which enter into the compoſition of our globe are ſubjected to the magnetic power, and that the whole maſs collectively forms one ſingle magnet.

" In favour of thoſe who might be deſirous of repeating his experiments, and rendering them very ſenſible, the author remarks, that the method of ſucceeding conſiſts in diminiſhing the ſize of the oſcillating bodies. From ſome eſſays, of which the reſults terminate this memoir, it ſeems to follow, that the accelerating forces are inverſely as the maſſes, or very nearly in the direct proportion of the ſurfaces; but Citizen Coulomb gives this rule only as a firſt deduction, which requires to be confirmed *."

The opinion of the general influence of magnetiſm on all terreſtrial bodies was, as we ſhall ſee hereafter, maintained by our countryman Dr Gilbert, though Coulomb has certainly the merit of having put it to the teſt of experiment.

37
Entertaining experiments.

Beſides the experiments which we have related, there are ſome that depend on the attractive power of the magnet, and which are ranked among ſcientific amuſements. We ſhall here deſcribe a few of theſe.

Before we relate the manner of making theſe experiments, it may be proper to deſcribe an inſtrument that is employed in ſome of them. This, from its form and apparent uſe, is called the magnetic perſpective glaſs, and is thus conſtructed.

38
Conſtruction of the magnetic perſpective glaſs.

Provide an ivory tube about 2½ inches long, and of ſuch a form as is expreſſed in fig. 9. The ſides of this tube muſt be ſo thin as to admit a conſiderable quantity of light. It is to open at one end with a ſcrew, and at that end muſt be placed an eye-glaſs of about two inches focus, and at the other end any glaſs you pleaſe. Have a ſmall magnetic needle like that in a compaſs. It muſt be ſtrongly touched, and ſo placed at the bottom of the tube that it may turn freely round. It is to be fixed on the centre of a ſmall ivory circle C, of the thickneſs of a counter, placed on the object-glaſs D, and painted black on the ſide next it. This circle muſt be kept faſt by a circular rim of paſteboard, that the needle may not riſe off its pivot, in the ſame manner as in the compaſs. This tube will thus become a kind of compaſs ſufficiently tranſparent to ſhow the motions of the needle. The eye-glaſs ſerves more clearly to diſtinguiſh the direction of the needle, and the glaſs at the other end, merely to give the tube the appearance of a common perſpective glaſs. It will appear, from what has been already ſtated, that the needle in this tube, when placed over and at a ſmall diſtance from a magnet, or any machine in which it is contained, will neceſſarily place itſelf in a poſition directed by that magnet, and conſequently ſhow where the north and ſouth pole of it is placed; the north end of the needle conſtantly pointing to the ſouth end of the magnet. This effect will take place, though the magnet be encloſed in a caſe of wood, or even metal. You muſt obſerve, however, that the attracting magnet muſt not be very far diſtant from the needle, eſpecially if it be ſmall, as in that caſe its influence extends but to a ſhort diſtance. This tube may be differently conſtructed, by placing the needle in a perpendicular direction, on a ſmall axis of iron, on which it muſt turn quite freely, between two ſmall plates of braſs placed on each ſide of the tube; the two ends of the needle ſhould be in exact equilibrium. The north and ſouth ends of the needle will, in like manner, be attracted by the ſouth and north ends of the magnetic bar. The former conſtruction, however, appears preferable, as it is more eaſily excited, and the ſituation of the needle much more eaſily diſtinguiſhed.

Exp. 1. *The communicative Piece of Money.*

39
Communicative piece of money.

Take a crown or dollar, and drill a hole in the ſide of it, in which place a piece of wire, or a large needle well poliſhed, and ſtrongly touched with a magnet. Then cloſe the hole with a ſmall piece of pewter, that it may not be perceived. Now, the needle in the magnetic perſpective before deſcribed, when it is brought near to this piece of money, will fix itſelf in a direction correſponding to the wire or needle in that piece. Deſire any perſon to lend you a crown piece or dollar, which you dexterouſly change for one that you have prepared as above. Then give the latter piece to another perſon, and leave him at liberty either to put it privately in a ſnuff-box, or not; he is then to place the box on a table, and you are to tell him by means of your glaſs, whether the crown is or is not in the box. Then bringing your perſpective cloſe to the box, you will know, by the motion of the needle, whether it be there or not: for the needle in the perſpective will

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* Nichol. Journ. 8vo. vol. ii.

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always keep to the north of itſelf, if you do not perceive it has any motion, you conclude the crown is not in the box. It may happen, however, that the wire in the crown may be placed to the north, in which caſe you will be deceived. Therefore, to be ſure of ſucceſs, when you find the needle in the perſpective remain ſtationary, you may, on ſome pretence deſire the perſon to move the box into another poſition, by which you will certainly know whether the crown-piece be there or not. You muſt remember that the needle in the perſpective muſt here be very ſenſible, as the wire in the crown cannot poſſibly have any great attractive force.

Exp. 2. *The Magnetic Table.*

40 Magnetic table.

Under the top of a common table place a magnet that turns on a pivot, and fix a board under it, that nothing may appear. There may alſo be a drawer under the table, which you pull out to ſhew that there is nothing concealed. At one end of the table there muſt be a pin that communicates with the magnet, and by which it may be placed in different poſitions; this pin muſt be ſo placed as not to be viſible to the ſpectators. Strew ſome ſteel filings or very ſmall nails over that part of the table where the magnet is. Then aſk any one to lend you a knife or a key, which will then attract part of the nails or filings. Then placing your hand in a careleſs manner on the pin at the end of the table, you alter the poſition of the magnet, and giving the key to any perſon, you deſire him to make the experiment, which he will then not be able to perform. You then give the key to another perſon, at the ſame time placing the magnet, by means of the pin, in the firſt poſition, when that perſon will immediately perform the experiment.

Exp. 3. *The Myſterious Watch.*

41 Myſterious watch.

You deſire any one in company who has a watch with a ſteel balance, (R) to lend it you for a few minutes, aſking him whether it will continue to go when laid on the table. He will probably ſay it will. To prove to him that he is wrong, you lay it on that part of the table below which you have previouſly placed a ſtrong bar-magnet (as in Exp. 2.), ſo that the watch may be above one of the poles. It will immediately ſtop. Now, if you ſhift the poſition of the magnet, and give the watch to another perſon to lay it on the table, it will not ſtop, but replacing the magnet, and deſiring a third perſon to try the experiment, he will ſucceed. All this, to thoſe who are not acquainted with the ſecret, will appear very extraordinary.

Exp. 4. *The Magnetic Dial.*

42 Magnetic dial.

Provide a circle of wood or ivory, of about five or ſix inches diameter, as fig. 10. which muſt turn quite free on the ſtand B (fig. 11.), in the circular border A; on the circle muſt be placed the dial of paſteboard C (fig. 10.), whoſe circumference is to be divided into 12 equal parts, in which muſt be inſcribed the numbers from 1 to 12, as on a common dial. There muſt be a ſmall groove in the circular frame D, to receive the paſteboard circle; and obſerve that the dial muſt be made to turn ſo freely that it may go round without moving the circular border in which it is placed. Between the paſteboard circle and the bottom of the frame, place a ſmall artificial magnet E (fig. 12.) that has a hole in its middle, or a ſmall protuberance. On the outſide of the frame place a ſmall pin P, which ſerves to ſhew where the magnetic needle I, that is placed on a pivot at the centre of the dial, is to ſtop. This needle muſt turn quite freely on its pivot, and its two ſides ſhould be in exact equilibrium. Then provide a ſmall bag, that has five or ſix diviſions, like a lady's work-bag, but ſmaller. In one of theſe diviſions put ſmall ſquare pieces of paſteboard on which are written the numbers from 1 to 12, and if you pleaſe you may put ſeveral of each number. In each of the other diviſions you muſt put 12 or more like pieces, obſerving, that all the pieces in each diviſion muſt be marked with the ſame number. Now the needle being placed upon its pivot, and turned quickly about, it will neceſſarily ſtop at that point where the north end of the magnetic bar is placed, and which you previouſly knew by the ſituation of the ſmall pin in the circular border. You therefore preſent to any perſon that diviſion of the bag which contains the ſeveral pieces on which is written the number oppoſite to the north end of the bar, and tell him to draw any one of them he pleaſes. Then placing the needle on the pivot, you turn it quickly about, and it will neceſſarily ſtop, as we have already ſaid, at that particular number.

Another experiment may be made with the ſame dial, by deſiring two perſons to draw each of them one number out of two different diviſions of the bag; and if their numbers, when added together, exceed 12, the needle or index will ſtop at the number they exceed it; but if they do not amount to 12, the index will ſtop at the ſum of thoſe two numbers. In order to perform this experiment, you muſt place the pin againſt the number 5, if the two numbers to be drawn from the bag be 10 and 7; or againſt 9, if they be ſeven and two. If this experiment be made immediately after the former, as it eaſily may, by dexterouſly moving the pin, it will appear the more extraordinary.

Exp. 5. *The Divining Circles.*

43 Divining circles.

On the top of a thin box, as AB fig. 13. paſte two circles drawn on paper, as F, G, each of which is divided into compartments. In thoſe of one circle, as G, are written queſtions, and in thoſe of the other, as F, appropriate anſwers. Through the centre of the circle G an axle paſſes, carrying a toothed wheel, and which works into the pinion *d*, to the axis of which is fixed another pinion, and this receives the teeth of another wheel *g*, whoſe axis is paſſed through the centre of the circle F. On the axis of the wheel *c* is to be fixed an index *a* above the paper circle, and to the axis of the wheel *g* juſt below the cover of the box, is fixed a bar magnet *q q*, turning together with the axis; while on the part of the axis that projects above the circle F a looſe needle *x x* is balanced, ſo as to move independently of the axis. A carton of ſtrong paper, of the ſize of

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(R) The balance of a watch is ſometimes, though very ſeldom, made of braſs, when it is ſcarcely ſuſceptible of magnetic influence.

[illegible] of F should cover the pasted circle, and turn easily on the centre e; and it should have a triangular piece as F cut out, in order to see the answers. If now the needle be taken off its point, and a person be desired to ask some of the questions on the circle G, the index must be turned to the question, and then the needle placed on its pivot, giving it a whirl round. When it stops, its point will stand over the proper answer, which may be seen by turning the open part of the carton to that place.

SECT. III. *Of the Communication and Production of Magnetism.*

The whole of this important part of the subject may be said to depend on one general fact, which we shall therefore first lay down and illustrate.

44 Iron becomes magnetical when near to a magnet. *Any piece of iron when in the neighbourhood of a magnet, becomes itself a magnet, and possesses all the material properties of that body.*

Ex. 1. Let there be a large and strong magnet properly supported in the horizontal direction, at a distance from iron or other similar bodies, and with its poles perfectly free. Take also any small piece of common iron, not more than two or three inches long, such as a common small key, and take another piece of iron, as a smaller key, or short piece of wire about the size of a goose quill.

In the first place hold the key in a horizontal position, with one end opposite one of the poles of the magnet, but so as not to be in contact with it. Then bring the other piece of iron to the other end of the key, and it will hang by the key, and will so continue to hang, though we withdraw the key from the magnet horizontally, till there is a certain interval between the key and the magnet, when the former will be no longer able to support the piece of iron. Even at this distance the key will, however, be found capable of supporting a piece of iron considerably smaller than the former, till its distance from the magnet be increased.

Again, hold the key with one extremity below one of the poles of the magnet, and touch the other extremity with the small piece of iron, the latter will adhere till the key be removed too far below the magnet.

Thirdly, Hold the key with one of its extremities above one of the poles of the magnet, but at such a distance that there is room for the small piece of iron to go between the key and the magnet, without touching the latter. The piece of iron will be supported by the key, as in the two former instances.

Fourthly, Let the magnet be placed in a vertical position, and hold the key with one extremity immediately below or above one of the poles. The piece of iron will be supported in a similar manner, in the former case by the extremity of the key that is most remote from the magnet, and in the latter by that which is adjacent.

If, instead of approaching the magnet with the key, we reverse the circumstances, the effect of the magnet in rendering the key magnetical will be still more evident. Suppose the piece of iron to be lying on the table; let one end of it be touched with the key, and there will be found no attraction between them: but if while we hold the key very near one extremity of the wire, we bring the pole of the magnet near the other end of the key, we shall see the wire rise from the table, and adhere to the key. [illegible]

In all these cases the attractive power of the key, that is, its magnetism, is evidently derived from its juxtaposition to the magnet.

Exp. 2. Let two pieces of iron wire be suspended by separate ends of a piece of thread, so that they may hang from a pin in the wall in a direction parallel to each other, or in contact. Now bring one end of a bar magnet a little below the wires, and they will repel each other. If these wires are of soft iron, they will collapse immediately on the magnet being withdrawn; but if they are formed of hard iron or of steel, they will continue apart for a considerable time.

Here the two wires are, by the proximity of the magnet, become magnets, and the extremities next the bar have each acquired a similar polarity, i. e. both contrary to that of the adjacent pole of the bar. They, therefore, repel each other.

Exp. 3. Let a bar magnet, such as N, S, fig. [illegible] be laid in a horizontal position, and let a small key, as B, C, be held near the north pole of the magnet, in the direction of its axis. Let a very small magnetic needle, supported on a sharp pivot, be brought near that end of the key C, which is most remote from N. The needle will immediately turn its south pole towards C, as is indicated by the feathered part of the arrow *c*. Hence it appears that the key has acquired a directive power like a magnet, and that its remote extremity performs the office of a north pole, as it attracts the south pole of the needle, and repels its north pole. If it be said that the magnetic needle in this case is affected directly by the directive power of the magnet, as it would take the above position though the key were not present; to shew that the effect is produced through the medium of the key, remove the needle into another situation as *b*, and it will still arrange itself with the same pole opposite C, and if it be carried to the proximate extremity of the key, as at *a*, it will turn round, and present its north pole to B, thus shewing that it is, at least in some measure, influenced by the key.

45 Nearest end acquires a polarity contrary to that of the adjacent pole of the magnet. In general, when a piece of iron is presented to the pole of a magnet, the extremity next that pole is possessed of the contrary polarity, and the remote extremity has acquired a similar polarity. The situation of the poles, however, depends much on the form of the piece of iron, and on the part of its surface which is presented to the pole of the magnet. If the form be that of an oblong bar, one extremity of which is presented to the pole, which is the most usual case, the circumstances will be as we have just mentioned. If the oblong bar be presented to the pole in a perpendicular direction, with its middle very near the pole of the magnet, this middle point will be possessed of a polarity contrary to that of the adjacent pole, while the two extremities have acquired the same polarity. If the presented iron be in the form of a circular plate, and its centre be held near the pole of the magnet, this centre will have the contrary polarity, and every point of the circumference the same polarity. If the plate have its circumference fashioned into points, each of these points will acquire a very strong polarity, contrary to that of the pole near which the centre of the plate is held.

The [illegible] [illegible] of magnetic power from the

Experimental illuſtrations. magnet to the key in the foregoing experiments, will be ſtill more ſtrongly illuſtrated by holding another piece of wire to the wire that is already ſuſpended by the key. The new piece of wire will alſo be ſuſpended, and ſo ſeveral more may be ſuſpended by one another, like the links of a chain, according to the ſtrength of the magnet. This fact was known to the ancients, who ſpeak of a loadſtone cauſing an iron ring to carry another ring; and that a third, till the whole puts on the appearance of a chain.

46 Induced magnetiſm. It will be found that the magnet has loſt none of its power by producing magnetiſm in the iron, and of courſe, that nothing has been *transferred* from the magnet to the iron. The magnetiſm of the iron thus cauſed by its juxtapoſition to a magnet is called *induced magnetiſm*, or *magnetiſm by induction*.

47 Apparent exception. There is an apparent exception to the univerſality of the above propoſition. If the key be held in ſuch a poſition as that it ſhall be perpendicular to the magnet, with one extremity either oppoſite one of the poles, or a little above the centre of the magnet, the bit of wire will not be attracted by that extremity, and we may hence ſuppoſe that the key has acquired no magnetic power by its proximity to the magnet. But if we bring a needle or a piece of iron wire near its remote end, it will be ſtrongly attracted, and ſhew that end to have the ſame polarity with the neareſt pole of the magnet. Now, the ends both of the key and the wire that are next the magnet, having the ſame polarity with the pole of the magnet neareſt them, cannot attract each other, but on the contrary will repel each other, and therefore the wire cannot adhere to the key, though by the change produced by the other extremity, it is evident that the key has acquired magnetic power.

48 Real exception. There is, however, one exception. If the key in the firſt experiment, with the wire hanging to it, be carried from any of the ſituations there deſcribed, towards the middle of the magnet, the wire will fall off as ſoon as it arrives very near the middle. If we ſuppoſe a plane to paſs through the centre of the magnet in a direction perpendicular to its axis, ſo as to form the magnetic equator, a ſlender piece of iron held any where within this plane can acquire no ſenſible magnetiſm, which is demonſtrated by its ſhewing no ſigns of polarity, and not being attracted by the magnet. Now it is well known that the greateſt activity of a magnet reſides in its two poles, and that thoſe magnets are the beſt in which this activity is leaſt diffuſed. A certain circumference of every magnet is entirely inactive, as we ſee in the experiment with the iron filings deſcribed in N° 26. where the filings collect themſelves principally on two points of the ſurface, between which there is a ſpace all round, to which no filings are attached. Many circumſtances ſhew that the two poles of a magnet have contrary actions; the north pole producing a ſtrong northern polarity in the remote end of an iron bar brought near it, and a ſouth polarity in the proximate end, while an oppoſite effect is produced by its ſouth pole. Now, adopting this principle, that the actions of the two poles are oppoſite, it follows that if theſe actions are equal, and act in a ſimilar manner, each muſt counteract and prevent the action of the other, and produce what may be called a *magnetic equilibrium*. Therefore if a ſlender iron rod or thin plate be placed ſo that every part of it lies within the magnetic equator, it will exhibit no magnetiſm, will not be attracted by the magnet, and will not attract iron. This will be ſeen more ſatisfactorily when we have explained the theory of magnetiſm.

The conſideration of the above important facts will enable us to explain, eſpecially after what will be ſtated in the next chapter, the production or communication of magnetiſm in all the methods by which theſe are uſually effected.

49 Artificial magnetiſm produced; Magnetiſm may be produced artificially in a piece of iron or ſteel, by various methods.

50 By touching with a magnet. 1. *By touching the iron or ſteel either with a natural magnet, or with a ſteel bar already magnetized.*

The proceſs of communicating magnetiſm by natural or artificial magnets, or by what has been called *touching*, has undergone various improvements and modifications, which we ſhall endeavour briefly to trace.

51 Old methods. The moſt ſimple method of magnetizing a bar of ſteel is to apply the north pole of a magnet to that extremity of the bar which we wiſh to acquire a ſouth polarity. In this way, merely by contact, a ſlight degree of magnetic power will, after ſome time, be imparted to the bar, and the communication will be expedited by ſtriking the bar ſo as to make it ſound. Only a ſlight degree of magnetiſm can, however, be communicated in this way, and unleſs the ſteel bar be very ſhort, its poles will be much confuſed.

Another method of communicating magnetiſm to a bar of this kind is, to apply the pole of a magnet to one end of the bar, and paſs it on to the other end, giving a moderate degree of preſſure. This is repeated ſeveral times on both ſides of the bar, taking care always to begin the ſtroke at the ſame end as at firſt, and inſtead of drawing the magnet back along the bar, lifting it up every time that we come to the other end. The following deſcription will beſt explain the mode of communicating magnetiſm in this way, by one or two magnetic bars.

When only one magnetic bar is to be made uſe of, one of its poles muſt be applied as repreſented fig. 15. where CD repreſents the needle or ſteel bar to be impregnated. The magnet AB is then to be drawn all along the ſurface of it, till it reaches the extremity D. The magnet being then removed, muſt be applied to the extremity C, and drawn over the needle as before. Thus the needle muſt be rubbed ſeveral times, by which means it will acquire a conſiderable degree of magnetiſm. In this method, the other extremity of the needle which the magnet touched laſt acquires the contrary magnetiſm; that is, if B be the north pole of the magnet, C will be the north pole and D the ſouth of the needle. This method, however, is never found to be equally effectual with that in which two magnets, or both poles of one magnet, are made uſe of.

To communicate magnetiſm by means of two magnetic bars, place the bar or needle AB, fig. 16. upon a table; then ſet the two magnetic bars CD, EF, ſtraight upright upon it at a little diſtance, equal on both ſides from the middle of the bar AB, and in ſuch a manner that the ſouth pole D of one of the bars may be neareſt to that end of the bar AB which is to become the north pole, &c. Theſe two bars muſt then be ſlid gradually towards one extremity of the bar, keeping them conſtantly at the ſame diſtance from each other; and when one of them, for inſtance CD, is arrived at A, then they muſt be ſlid the contrary way, till EF arrives at B; and thus the bar AB muſt be rubbed a greater or ſmaller number of times, till it will be found by trial to have acquired a conſiderable power. When the magnetic bars are powerful, and the bar AB of very good ſteel, and not very large, a dozen of ſtrokes are fully ſufficient; but when the bars are to be removed from the bar AB, care muſt be taken to bring them to the ſame ſituation where they were firſt placed; viz. a little and equal diſtance from the middle of the bar AB, from which they may be lifted up.

The mode of employing two bars inſtead of one was an improvement, and the method was ſtill farther improved by placing them in an inclined poſition, with their extremities C, E, remote from each other, and ſliding them contraryways from the middle towards each extremity of the bar AB, lifting them up when they come to the extremities, and replacing them on the middle of the bar, thus repeating the operation as often as required.

52 Method of touching curved bars.

Horſe ſhoe bars, or thoſe of a ſemicircular form, may be magnetized in a ſimilar manner, except that the magnetic bars employed for the purpoſe muſt follow the curvature of the bar to be impregnated. The following is the method uſually employed for magnetizing bars of this kind. The crooked bar is laid flat upon a table, and to each of its extremities is applied a ſtraight magnetic bar, as DF, EG, fig. 17. and the remote extremities of theſe bars F, G, are joined by the conductor or piece of ſoft iron FG. Then to its middle are to be applied two magnetic bars, with their oppoſite poles at a little diſtance from each other, H, I, and with theſe the crooked bar is to be ſtroked from end to end, following the direction of the crooked bar, ſo that on one ſide of it the magnetic bars may ſtand in the direction repreſented by the dotted lines at K and L. When in this manner the piece of ſteel ABC has been rubbed a ſufficient number of times on the one ſide, it is to be turned, and the ſame operation repeated on the other ſide, taking care that the adhering magnetic bars, and the conductor of ſoft iron, be preſerved in the ſame ſituation as at firſt. It muſt be obſerved that in this proceſs the magnets DF, DG, as well as the magnets H, I, muſt be placed ſo that their ſouth poles ſhall be towards that extremity of the bar which is to be made a north pole.

53 Duhamel's improvement.

A material improvement in the proceſs for communicating magnetiſm from artificial magnets to ſteel bars, was introduced by Duhamel. He formed a right-angled parallelogram, two of the ſides of which were made by two equal bars of ſteel, that were intended to be magnetized, while the other two were formed by joining the extremities of the ſteel bars by two pieces of ſoft iron, alſo equal to each other in length, but much ſhorter than the ſteel bars. Then taking two parcels of bars already magnetized, he brought together their oppoſite poles towards the middle of one of the ſteel bars forming the parallelogram, and inclining the parcels as in fig. 18. he made them glide gently, ſeparating them from each other towards the extremities of the bar; and this operation was repeated as often as required, when the inclined parcels of magnetic bars were carried to the oppoſite bars of the parallelogram, and this was rubbed in a ſimilar manner. After the bars were rubbed ſufficiently on one ſide, they were, as in former caſes, turned on the other.

This method is one of the beſt that we can employ for magnetizing the needles of compaſſes, and ſuch ſteel bars as are of a moderate thinneſs, eſpecially if we employ magnetic bars ſtrongly impregnated for the purpoſe of rubbing the ſteel bars.

54 Improvement by Mitchell and Canton.

Much about the time that M. Duhamel contrived the above method, the ſame object was employing the attention of experimental philoſophers in England, where the proceſs of magnetizing bars was much improved by Mr Mitchell and Mr Canton.

Mr Mitchell employed two parcels of bars already ſtrongly magnetized, joined together in a parallel direction, with their oppoſite poles united at each extremity, but in ſuch a manner, that there remained between the two parcels a ſmall interval. He then placed a number of equal ſteel bars in a ſtraight line, and made one extremity of the magnetized bars ſlide over the line formed by the ſteel bars at right angles; and this he repeated as uſual. In this way he found that the intermediate bars in the ſtraight line acquired a great degree of magnetic power.

Mr Canton placed the bar which he wiſhed to magnetize, ſo as to form part of a parallelogram, as in the method of M. Duhamel, and then employed the ſame means as Mr Mitchell for impregnating the bar, after which he ſeparated the two parcels of magnets, and inclining them to each other in the manner of Duhamel upon the bar, he made them ſlide from the needle towards the extremities. This laſt method conſiderably augmented, according to Mr Canton, the magnetic power of the bar; but by Coulomb it is conſidered as the only effectual part of the proceſs. Theſe methods of Mitchell and Canton conſtitute what has been called the double touch, which was ſtill farther improved by the celebrated Æpinus.

55 Method of Æpinus.

This philoſopher, after having formed a parallelogram with ſteel bars, and pieces of ſoft iron, in the manner of Duhamel, placed upon the bar to be magnetized, two parcels of magnetic bars inclined in ſuch a way that each of them formed on its own ſide an angle of 15° or 20° with the ſteel bar on which it was placed; their oppoſite poles being at a very ſmall diſtance from one another. Keeping the parcels of magnetic bars in the ſame relative ſituation with reſpect to each other, he made both parcels ſlide along alternately from the middle of the bar towards each extremity, beginning at every renewal of the operation from the middle of the bar. This method has a very great advantage over the former, as by it we may magnetize bars of conſiderable length and thickneſs, by means of magnetic bars that have no great magnetic power.

56 Remarks.

In all theſe proceſſes it muſt be remarked, that, in order to proceed properly, it is neceſſary to employ a conſiderable degree of preſſure. A parallelogram of ſteel bars and ſoft iron ſhould be kept firm by wedges, ſomewhat in the manner of printers types, and the extremities of the magnetic bars ſhould be perfectly cleaned. Dr Robiſon ſuppoſed, that wetting theſe extremities conſiderably aided the proceſs; but he found that the leaſt particle of oil between the bars greatly obſtructed it, as did the ſmalleſt piece of the thinneſt gold leaf. He found that bars which were rough acquired a more powerful magnetiſm than thoſe which were moderately poliſhed; but that, if moderately rough, they acquired the firſt degrees of magnetiſm more expeditiouſly than ſmooth bars, but did not receive ſo ſtrong an impregnation as the latter.

[illegible] The method of making artificial magnets has been greatly improved by M. Coulomb, who in a ſeries of memoirs, printed in the Memoirs of the Academy of Sciences, and of the National Inſtitute of Paris, has communicated a number of valuable obſervations and experiments that have contributed, perhaps more than any preceding labours, to the advancement both of the theory and practice of magnetiſm. Many years ago he publiſhed his proceſs for making very powerful artificial magnets.

In his operations he uſes four very ſtrong magnets previouſly impregnated. He placed his two ſtrongeſt magnets, (as NS, NS, fig. 19.) on an horizontal plane in one right line, at ſuch a diſtance that they might be a few lines nearer to each other than the length of the needle *n s* intended to be magnetized. He afterwards took the two magnets N′S′, and inclining them as in the method of Æpinus, he placed them firſt on the middle of the needle, or with their poles nearly in contact. He then drew each magnet, without changing its inclination, to the extremity of the needle, and repeated this operation 5 or 6 times on each face of the needle. It is clear, that in this operation the poles of the needle *n s* remain fixed and invariable at the extremities of the needle, by means of the two ſtrong magnets NS on which it reſts. The effect produced by theſe can only be augmented by the action of the two ſuperior magnets, which concur in magnetizing all the particles of the needle in the ſame direction.

He found likewiſe, that in this method of magnetizing there is a greater certainty of giving to both ſurfaces of needles intended to determine the magnetic meridian, an equal degree of magnetiſm; a circumſtance deſerving of the greateſt attention in the conſtruction of compaſſes, if the needle be ſuſpended with its broadeſt ſurface parallel to the horizon.

After theſe previous proceſſes, he took 30 bars of ſteel hardened and tempered to the temper of a ſpring, five or ſix lines broad, two or three lines thick, and 36 inches long. The blades of fencing foils, ſuch as are found in the ſhops, make pretty good magnets. Engliſh ſheet ſteel cut into pieces one inch wide, hardened and lowered to ſpring temper, is preferable. When each compound magnet is to contain no more than 15 or 20 pounds of ſteel, it is ſufficient to make the bars 30 or 36 inches long.

He magnetized each bar ſingly, according to the method already deſcribed. He then took two rectangular parallelopipedons of very ſoft iron, well poliſhed, ſix inches in lengh, between 20 and 24 lines broad, and 10 or 12 lines thick. With theſe two parallelopipedons, repreſented fig. 20. at N and S, he formed the armour of his magnet by enveloping one extremity of each parallelopipedon with a ſtratum of his magnetic bars, ſo that the extremities of the parallelopipedons may project beyond the extremities of the bars 20 or 24 lines, and the other end may be enveloped by the ends of the ſet of bars. On this firſt layer of ſteel bars of three or four lines thick he places a ſecond, three inches ſhorter than the firſt, ſo that the firſt projects beyond the ſecond about 18 lines on each ſide. The whole is ſecured at the ends by two binding pieces of copper, which preſs the bars cloſe together, and prevent the armour from eſcaping.

Experiment to illuſtrate.

Fig. 20. repreſents two artificial magnets compoſed according to the method juſt deſcribed. N and S are the extremities of the two iron parallelopipedons. The two other extremities are incloſed by the bars. Each magnet thus compounded is ſolidly connected together by the copper pieces marked *a*, *b*, *a′*, *b′*. The pieces of contact A, B, join the oppoſite poles of the magnets.

He found by experience, that with an apparatus of this form, each part weighing 15 or 20lbs. a force of 80 or 100lb. will be required to ſeparate the pieces of contact; and that when an ordinary needle of the compaſs is placed on the two extremities of the compound bars, fig. 20. they become magnetized to ſaturation, without its being neceſſary to obſerve, that when magnets of greater force are deſired, it is neceſſary, in proportion as the number of bars is increaſed, to augment their length alſo, and the dimenſions of the parallelopipedons of iron which ſerve for the armour. It would be eaſy to aſcertain the different dimenſions which the magnets ought to have, in a manner ſufficiently accurate for practice, from the laws of magnetiſm, and the poſition of the centre of action of the bars of ſteel of different lengths and thickneſs.

58
Iron or ſteel becomes magnetic by poſition.

2. *Iron or ſteel is rendered magnetical by being placed in a poſition correſponding to the magnetic meridian.*

It has been often obſerved, that a bar of iron which has ſtood for a long time exactly or nearly in the magnetic direction, has acquired a degree of magnetic power, the extremities poſſeſſing oppoſite polarity. In this and other northern parts of Europe, old vanes of turrets, window bars, and even pokers that have ſtood long inclined in the chimney corner, are often very ſenſibly magnetic, their lower extremity becoming a north, and the upper a ſouth pole. In the higheſt part of the ſteeple of St Giles's church in Edinburgh, on the north ſide, the upper bar of a hand-rail leading to a ſtair is very magnetical. It is worthy of remark, that thoſe parts of ſuch old bars which have become foliated and crumbly by expoſure to the air are the moſt magnetical. This magnetic ſtate of perpendicular iron bars was, as we are informed by Dr Gilbert, firſt obſerved in the vane ſpindle of the Auguſtine church at Mantua.

59
By hammering or friction.

3. *A bar of ſteel long hammered or expoſed to violent friction, while lying in the magnetic meridian, becomes magnetic.*

This fact was well known to Dr Gilbert, who in a plate repreſents a blackſmith hammering a bar of ſteel in the magnetic poſition. Many ſmiths tools, ſuch as long drills, that receive great preſſure while in motion, broaches that are worked with a long lever, ſo as to act very faſt, become very ſenſibly magnetical; the lower end, in theſe latitudes, being always a north pole. When a ſteel punch is driven hard into a piece of iron, the punch has ſometimes been rendered magnetical by a ſingle blow. There is ſcarcely a cutting or boring tool in a ſmith's ſhop that does not poſſeſs ſome degree of magnetic power. Even ſoft ſteel and iron will acquire it by being violently twiſted or expoſed to great friction, and the magnetiſm thus acquired

Experimental Illustrations.

quired is commonly permanent. From this circumstance it is difficult to procure for these experiments pieces of iron that do not poſſeſs ſome degree of magnetiſm, and hence theſe experiments do not always ſucceed. It is therefore convenient to know how to deprive iron and ſteel of magnetiſm, and the method of doing this will appear from what will be ſaid in the next ſection.

The ſteel balances of watches are often magnetic, ſometimes even ſhewing evident polarity; a circumſtance which is found to have ſome effect in diſturbing the proper going of ſuch watches or time-pieces. Hence it is recommended to make the balances of braſs. See a paper on this ſubject by Mr Varley, in the firſt volume of the Philoſophical Magazine.

4. *Magnetiſm may be induced on ſubſtances that are ſuſceptible of it, by heat.*

62 By heat.

Dr Gilbert remarks that ſuch ores of iron as are in that particular metallic ſtate, which he conſiders as moſt ſuſceptible of magnetiſm, will acquire this power by being kept long in a red heat, while in a magnetic direction; and that their polarity correſponds to their poſition, that end of the maſs which is oppoſite the north becoming a north pole. By many experiments made both by Dr Gilbert, and ſince his time by Dr Hook, on iron and ſteel bars, it appears that theſe acquire permanent magnetiſm by being expoſed to a ſtrong heat, and ſuffered to cool gradually while lying in the magnetic direction; but that the magnetiſm thus acquired by ſteel rods is much ſtronger and more durable, if they are ſuddenly quenched with cold water, ſo as to give them a very hard temper. Dr Hooke found that the end of the bar next the north, or the lower end of a vertical bar, always became its permanent north pole, and the upper end, even when quenched, while the reſt was ſuffered to cool gradually, became a very ſenſible ſouth pole. If theſe operations were performed on bars placed in a poſition at right angles to the magnetic direction, no magnetiſm was acquired. Dr Gilbert makes a remarkable obſervation reſpecting the poſition of a magnetic needle brought near an ignited bar of iron, which was ſome years ago repeated in the Philoſophical Tranſactions as a new diſcovery. "*Bacillum ferreum, candens igneum cuſpide verſorio excito: ſtat verſorium, nec ad tale ferrum convertitur: ſed ſtatim ut primum de candore aliquid remiſerit, confluit illico.*" Thus it appears that iron is not ſuſceptible of magnetiſm when red hot, but that it acquires magnetic power during its cooling. Dr Gilbert aſcertained the degree of heat moſt favourable to the production of magnetiſm, but from his want of proper thermometers he did not ſucceed. Dr Robiſon found that though a bright red or a white heat does not make iron ſuſceptible of magnetiſm while it is expoſed to ſuch a heat, it prediſpoſes it for becoming magnetical. He found that when a bar of ſteel was made to acquire magnetiſm by being tempered in the magnetic direction, the acquired magnetiſm was much ſtronger when the bar was firſt made very hot, even though allowed to acquire its moſt magnetical ſtate before being quenched, than if it had been heated only to this latter degree. Nay, he always found it ſtronger if quenched [illegible].

He also [illegible] a ſmall ſteel bar [illegible] red hot, and [illegible] being [illegible] two [illegible]

magnets, it acquired a more [illegible] than it would acquire in any other way.

Mr Canton contrived the following method of producing magnetiſm in ſteel bars, without the aſſiſtance either of natural or artificial magnets.

61 Canton's method of making artificial magnets.

Take twelve bars, ſix of ſoft, and ſix of hard ſteel, the former three inches long, one-fourth of an inch broad, and one-twentieth of an inch thick; with two pieces of iron, each half the length of one of the bars, but of the ſame breadth and thickneſs. The ſix hard bars ſhould be each five inches and a half long, one-half inch broad, and three-twentieths of an inch thick, with two pieces of iron of half the length, but of the ſame breadth and thickneſs as one of the hard bars; and let all the bars be marked with a line quite round them at one end; then take an iron poker and tongs, or two bars of iron, the larger they are, and the longer they have been uſed, the better; and fixing the poker upright, or rather in the magnetical line between the knees, hold to it, near the top, one of the ſoft bars, having its marked end downward, by a piece of ſewing ſilk, which muſt be pulled tight by the left hand, that the bar may not ſlide; then graſping the tongs with the right hand, a little below the middle, and holding them nearly in a vertical poſition, let the bar be ſtroked by the lower end from the bottom to the top about ten times on each ſide, which will give it a magnetic power ſufficient to lift a ſmall key at the marked end; which end, if the bar were ſuſpended on a point, would turn towards the north, and is therefore called the north pole, and the unmarked end, for the ſame reaſon is called the ſouth pole. Four of the ſoft bars being impregnated after this manner, lay the other two parallel to each other, at a quarter of an inch diſtant, between the two pieces of iron belonging to them, a north and a ſouth pole againſt each piece of iron; then take two of the bars already made magnetical, and place them together ſo as to make a double bar in thickneſs, the north pole of the one even with the ſouth pole of the other, and the remaining two being put to theſe, one on each ſide, ſo as to have two north and two ſouth poles together, ſeparate the north from the ſouth poles at one end by the interpoſition of ſome hard ſubſtance (I, fig. 21.), and place them perpendicularly with that end downward on the middle of one of the parallel bars AC, the two north poles towards its ſouth end, and the two ſouth poles towards its north end. Slide them three or four times backward and forward the whole length of the bar; then removing them from the middle of this bar, place them on the middle of the other bar BD as before directed, and go over that in the ſame manner; then turn both bars the other ſide upwards, and repeat the former operation: this being done, take the two bars from between the pieces of iron, and placing the two outermoſt of the touching bars in their ſtead, let the other two be the outermoſt of the four to touch theſe with; and this proceſs being repeated till each pair of bars have been touched three or four times over, will give them a conſiderable magnetic power.

When the ſmall bars have been thus rendered magnetic, in order to communicate the magnetiſm to the large bars, lay two of them on the table, [illegible] iron pieces as before; then form a compound [illegible] with the ſmall bars, placing three [illegible] with the north pole downwards, and the three others with the south pole downwards. Place the two parcels at a distance, ... with four in them, the north extremity of the one parcel being put contiguous to the south extremity of the other, and with this compound magnet touch each of the large bars, one after another, about twenty times on each side, by which means they will acquire a strong magnetic power.

Now the four large bars having been so far rendered magnetic, the small bars are laid aside, and the large ones are strengthened by themselves, in the manner directed for the small bars.

To expedite the operation, the bars ought to be fixed in a groove, or between braſs pins, otherwiſe the attraction and friction between the bars will be continually deranging them when placed between the conductors.

This whole proceſs may be gone through in about half an hour, and each of the large bars, if well hardened, will lift about 28 ounces troy, and they are fitted for all the purpoſes of magnetiſm in navigation and experimental philoſophy. The half dozen being put into a caſe in ſuch a manner as that no two poles of the ſame name may be together, and their irons with them as one bar, they will retain the virtue they have received; but if their power ſhould, by making experiments, be ever ſo much impaired, it may be reſtored without any foreign aſſiſtance in a few minutes.

Theſe bars muſt be kept in a wooden box, arranged in ſuch a manner that their oppoſite poles may lie together, as repreſented at fig. 22.

62
Marcel's method.

There are various methods of communicating a permanent magnetiſm to ferruginous bodies, by means of a bar rendered magnetic, by poſition, of which the moſt ſimple is that deſcribed by Mr Marcel, whoſe experiments were made in the year 1726. Being employed in making ſome obſervations on the magnetic power which he found in great pieces of iron, he took a large vice weighing 90 pounds, in which he fixed a large anvil weighing 12 lbs. The ſteel to which he wiſhed to give the magnetic power was laid upon the anvil in a north and ſouth poſition, which happened to be the diagonal of the ſquare ſurface of the latter. He then took a four cornered piece of iron an inch thick every way, 33 inches long, weighing about 8 lbs. having one end ſmooth and brightly poliſhed, the other being tapered. Holding then the ſteel faſt upon the anvil with the one hand, he took the iron bar in the other, and holding it perpendicularly, he rubbed the ſteel hard with the poliſhed part towards him from north to ſouth, always carrying the bar far enough round about to begin at the north. Having thus given 10 or 12 ſtrokes, the ſteel was turned upſide down, and rubbed as much on the other ſide. Proceeding in this manner till it had been rubbed 400 times, the ſteel was as ſtrongly magnetic as if it had been touched by a powerful loadſtone. The place where he began to rub was always the north pole. In theſe experiments it ſometimes happened that the virtue was imparted by a few ſtrokes; nay, by a ſingle ſtroke a ſmall needle was made to receive a very conſiderable power. Thus he imparted to two compaſs needles ſuch a degree of magnetic power, that one lifted three-fourths, and another a whole ounce of iron, and although theſe needles were anointed with linſeed oil to keep them from ruſting, and a hard coat was thus formed upon them, they nevertheleſs retained their power. Thus alſo a knife was made ſo ſtrongly magnetical, that it would take up an ounce and three-fourths of iron. Four ſmall pieces of ſteel, each an inch long, and one-twelfth of an inch broad, as thin as the ſpring of a watch, were thus impregnated with the magnetic power, and then joined into a ſmall artificial magnet; which at its firſt formation took up eight times its own weight of iron; and after being ſix years kept in the moſt careleſs manner, was found to have gained rather than loſt any thing of its power. In the courſe of his experiments, Mr Marcel found, that the end at which he began to rub was always the north pole, whatever poſition the ſteel was laid in. On rubbing a piece of ſteel from one end to the middle, and then from the other end to the middle, it acquired two north poles, one at each end, the middle being a ſouth pole. Beginning to rub from the middle towards each end, he found a north pole in the middle, and a ſouth pole at each extremity.

Experimental Illuſtrations.

63
Method of magnetizing a piece of ſoft ſteel.

Magnetiſm may be communicated to a ſmall piece of ſoft ſteel in the following manner: take two iron bars of about an inch ſquare, and upwards of three feet in length; keep them in the magnetical line, or in a perpendicular poſture, as repreſented fig. 23. Let the piece of ſteel CB be either faſtened to the edge of a table, or held by an aſſiſtant; and placing the lower extremity of the bar AB, and the upper extremity of the bar CD, on oppoſite ſides, and in the middle of the ſteel, ſtroke the latter from the middle towards its extremities, moving both bars at the ſame time. When both are arrived at the extremities of the ſteel, remove them from it, and apply them again to the middle. Do ſo for 40 or 50 times, and the ſteel will be found to have a conſiderable degree of magnetic power. Care, however, muſt be taken, in removing the bars, not to draw them along the ſurface of the ſteel, or the experiment will not ſucceed, becauſe the magnetiſm is deſtroyed by the contrary ſtrokes.

64
Dr Knight's artificial loadſtones.

The late Dr Gowin Knight poſſeſſed a ſurpriſing ſkill in magnetiſm, being able to communicate an extraordinary degree of attractive or repulſive power, and to alter or reverſe the poles at pleaſure; but as he refuſed to diſcover his methods upon any terms whatever (even as he ſaid, though he ſhould receive in return as many guineas as he could carry), theſe curious and valuable ſecrets have died with him. In the 69th volume of the Philoſophical Tranſactions, however, Mr Benjamin Wilſon has given a proceſs, which at leaſt diſcovers one of the leading principles of Dr Knight's art, and may perhaps be a means of diſcovering the whole to thoſe who ſhall be leſs reſerved. The doctor's proceſs, according to Mr Wilſon, was as follows. Having provided himſelf with a great quantity of clean iron filings, he put them into a large tub, that was more than one-third filled with clean water; he then, with great labour, worked the tub to and fro for many hours together, that the friction between the grains of iron by this treatment might break off ſuch ſmaller parts as would remain ſuſpended in the water for a time. The obtaining of theſe very ſmall particles in ſufficient quantity ſeemed to him to be one of the principal deſiderata in the experiment. The water being by this treatment rendered very muddy, he poured the ſame into a clean iron veſſel, leaving the filings behind;

Experimental Illuſtrations.

hind; and when the water had ſtood long enough to be clear, he poured it out carefully, without diſturbing ſuch of the ſediment as ſtill remained; which now appeared reduced almoſt to an impalpable powder. This powder was afterwards removed into another veſſel in order to dry it; but as he had not obtained a proper quantity thereof by this one ſtep, he was obliged to repeat the proceſs many times. Having at laſt procured enough of this very fine powder, the next thing was to make a paſte of it, and that with ſome vehicle which would contain a conſiderable quantity of the inflammable matter; for this purpoſe he had recourſe to lintſeed oil in preference to all other fluids. With theſe two ingredients only he made a ſtiff paſte, and took particular care to knead it well before he moulded it into convenient ſhapes. Sometimes, while the paſte continued in its ſoft ſtate, he would put the impreſſion of a ſeal upon the ſeveral pieces; one of which is in the Britiſh Muſæum. This paſte was then put upon wood, and ſometimes on tiles, in order to bake or dry it before a moderate fire, at about the diſtance of a foot. He found that a moderate fire was moſt proper, becauſe a greater degree of heat made the compoſition frequently crack in many places. The time required for the baking or drying of this paſte was generally about five or ſix hours before it attained a ſufficient degree of hardneſs. When that was done, and the ſeveral baked pieces were become cold, he gave them their magnetic power in any direction he pleaſed, by placing them between the extreme ends of his large magazine of artificial magnets for a few ſeconds or more as he ſaw occaſion. By this method the power they acquired was ſuch, that when any of theſe pieces were held between two of his beſt ten guinea bars, with its poles purpoſely inverted, it immediately of itſelf turned about to recover its natural direction, which the force of thoſe very powerful bars was not ſufficient to counteract.

In the 66th volume of the Philoſophical Tranſactions we have the following account from Dr Fothergill, of Dr Knight's method of imitating natural magnets, but which is by Mr Cavallo ſuppoſed to be ſome miſtake or miſinformation. "I do not know, ſays he," that ever the doctor (Dr Knight) left behind him any deſcription of a compoſition he had made to form artificial loadſtones. I have ſeen in his poſſeſſion, and many other of his friends have likewiſe ſeen, ſuch a compoſition, which retained the magnetic virtue in a manner much more fixed than either any real loadſtone, or any magnetic bar, however well tempered. In the natural ones he could change the poles in an inſtant, ſo likewiſe in the hardeſt bars, but in the compoſition the poles were immoveable. He had ſeveral ſmall pieces of this compoſition which had ſtrong magnetic powers. The largeſt was about half an inch in breadth, very little longer than broad, and near one-fourth of an inch thick. It was not armed, but the ends were powerfully magnetic; nor could the poles be altered, though it was placed between two of his largeſt bars, and they were very ſtrongly impregnated. The maſs was not very heavy, and had much the appearance of a piece of black lead, though not quite ſo ſhining. I believe he never divulged the compoſition, but I think he once told me, the baſis of it was filings of iron reduced by long-continued attrition to a perfectly impalpable ſtate, and then incorporated with ſome pliant matter to give it due conſiſtence."

Experimental Illuſtrations.

From theſe accounts it appears that the baſis of Dr Knight's artificial loadſtones was the black powder to which iron filings are reduced by being ſhaken with water, or the *black oxide of iron*, formerly called martial æthiops. Hence Mr Cavallo ſuppoſes that the following receipt for imitating the natural magnets will anſwer the purpoſe.

Take ſome martial æthiops, reduced into a very fine powder, or, which is more eaſily procured, *black oxide of iron*, the ſcales which fall from red-hot iron when hammered, and are found abundantly in ſmiths ſhops. Mix this powder with drying lintſeed oil, ſo as to form it into a very ſtiff paſte, and ſhape it in a mould ſo as to give it any form you require, whether of a terrella, a human head, or any other. This done, put it into a warm place for ſome weeks, and it will dry ſo as to become very hard; then render it magnetic by the application of powerful magnets, and it will acquire a conſiderable power.

SECT. IV. *Of the Circumſtances which tend to impair or deſtroy the Magnetic Power.*

65 Magnetiſm loſt or deſtroyed

The magnetic power in all its modifications, whether of attraction, repulſion, or polarity, is in general temporary and periſhing. The beſt magnets, whether natural or artificial, unleſs carefully preſerved, with attention to certain circumſtances that will preſently appear, are obſerved to have their magnetic power diminiſhed. Natural magnets, and artificial magnets made of ſteel tempered as hard as poſſible, retain their power moſt obſtinately, and ſeldom entirely loſe it except under circumſtances which we know to be unfavourable to its durability. Magnets of ſteel of a ſpring temper, are much ſooner weakened, loſe more of their force merely by keeping, and finally retain little or none of it. Soft ſteel and iron ſeldom retain magnetic power when removed from the magnet where they acquired it, unleſs their metallic ſtate undergoes ſome change.

The following circumſtances have been obſerved to be moſt powerful in diminiſhing or deſtroying the power of magnets.

66 By improper poſition;

1. *Improper poſition.* Nothing has ſo much effect in impairing the power of a magnet as keeping it in an improper poſition, that is, too far from the magnetic line. If the axis of the magnet be placed in a direction that is at right angles with the magnetic meridian, that is, in this latitude nearly E. N. E. and W. N. W, it will ſooneſt loſe its magnetic power; and if it be placed in the magnetic line, but in a contrary poſition, or with the north pole where the ſouth pole ſhould be, if permitted to vibrate freely, it will gradually become weaker every day, and unleſs it be a natural magnet, or an artificial one made of very hard tempered ſteel, it will, in no very long time, entirely loſe its magnetic power.

67 By heat;

2. *Heat.* The diminution of magnetic power is greatly promoted by heating the magnet. The heat of boiling water has a ſenſible effect in this way; but if the magnet be expoſed to a red heat, its power is entirely deſtroyed, as has been long known. Dr Gilbert obſerved that the power of magnets was deſtroyed by a

heat that was not ſufficient to make the metal viſible in the dark: and M. Coulomb found that the heat of boiling water weakened the power of a magnet, but that the greateſt part of this was recovered as the magnet cooled. If the heat be applied when the magnet lies in a poſition moſt favourable to the diſſipation of magnetiſm, the power is ſooneſt deſtroyed; hence, the beſt way to deprive iron or ſteel of accidental magnetiſm is, to heat it red-hot, and allow it to cool while lying in a direction perpendicular to the magnetic line.

M. Coulomb has determined that at 200 degrees of heat, two fifths of the magnetiſm of a magnet is diſſipated, and that at 500 degrees the whole is loſt.

3. *By rough treatment.* It is very extraordinary that the power of a magnet is impaired by rough uſage. Dr Gilbert obſerved that a magnet which he had powerfully impregnated was greatly weakened by a ſingle fall on the floor; and ſince his time it has been obſerved that when a magnet falls on a ſtone, or receives any concuſſion that makes it ring, it is injured much more than by being beaten with any thing ſoft and yielding. When a natural magnet is ground with coarſe powders, in order to bring it to any required form, it is conſiderably weakened. This ſhews the propriety of altering the natural form of loadſtones as little as poſſible, and where this is neceſſary, of doing it as expeditiouſly as may be, by cutting them briſkly in the direction of a lapidary's wheel.

4. *Placing two near each other with their ſimilar poles oppoſite.* Magnets ſituated in this way always weaken each other, and when a powerful magnet is placed near a weaker, with their ſimilar poles oppoſed, the polarity of the weaker is frequently reverſed, that is, if the pole was north it becomes ſouth, and *vice verſa.* When the weaker magnet is a natural loadſtone, or has been made of hard tempered ſteel, its original polarity is reſtored when the improper poſition is changed; but if it has been made of ſpring-tempered ſteel, the alteration is generally permanent, and often as complete as while the magnets were in the neighbourhood of each other.

Chap. III. *Theory of Magnetiſm.*

[illegible] ents.

Respecting the notions which the ancient philoſophers entertained about the cauſe of magnetic phenomena, we know very little. One curious opinion which they entertained of the reaſon why a magnet was improved by the contact of iron, is worth noticing. They conceived that the magnet *fed upon the iron*, and hence acquired additional attractive power; and when deprived of this pabulum, it grew weak and languid.

> —— "Nam ferro nurunt vitam, ferrique vigore
> Veſcitur; hoc dulces epulas, hoc pabula novit;
> Hinc proprias renovat vires, hinc fuſa per artus
> Aſpera ſecretum ſervant alimenta vigorem.
> Hoc abſente perit, triſti morientia torpent
> Membra fame, venaſque ſitis conſumit apertas."
>
> Claudian.

In the 16th century, the philoſophers of modern times first began to ſpeculate about the cauſe of magnetic polarity, a phenomenon which then became intereſting on account of the difference of declination obſerved by navigators. Various trifling opinions were publiſhed on the ſubject. Some ſaid that the needle was directed by a certain point in the heavens, which was little more than ſaying that it pointed one way. Others aſcribed the direction of the needle to vaſt magnetic rocks ſituated in the earth; but as to the exact ſituation of theſe rocks, they did not give themſelves the trouble to inquire, till Fracaſteri obſerved, that, if thoſe rocks are ſuppoſed to be ſituated in any part of the globe yet viſited by navigators, and if, as we muſt ſuppoſe, they act like loadſtones, they will cauſe the direction to be very different from what is obſerved. He therefore placed them ſomewhere in the inacceſſible polar regions, though not immediately at the poles. Norman, who, as we have ſeen (*Dipping Needle*), diſcovered the dip of the magnetic needle, and obſerved that in every part of Europe, the north pole pointed very far below the horizon, was naturally led to aſcribe this effect to the influence of the earth, though he does not expreſs himſelf as if he thought that the needle was attracted by any point within the earth, but only that it was always directed to ſuch a point.

[illegible] Theory.

71 Gilbert's theory.

From comparing the different poſitions of the compaſs needle, as deſcribed by Norman, with the poſitions which he had himſelf obſerved ſmall needles to aſſume in relation to a magnet, Dr Gilbert was naturally led to conſider the earth as a great loadſtone, or elſe containing a great loadſtone within it, which arranged the dipping needle, or the needle of the compaſs, in the ſame manner as he obſerved a ſmall needle poiſed on its pivot, to be arranged by a large magnet. Dr Gilbert has explained his theory at large in his *Phyſiologia Nova de Magnete, et de Tellure Magno Magnete.* It may be briefly expreſſed in the following terms. All the appearances of natural magnetiſm are ſimilar to what would be obſerved in the earth, were a large magnet with its poles ſituated near the poles of the equator, viz. the north pole not far from Baffin's bay in North America, and the ſouth pole in about the oppoſite part of the globe. If a dipping needle were expoſed to the influence of ſuch a large magnet, it muſt arrange itſelf in a plane paſſing through the magnetic poles, a poſition indicated very nearly by the mariners needle; and the more we recede from the equator of the great magnet, the more muſt the dipping needle be inclined to the horizon.

Dr Gilbert's theory was equally ingenious and important, and affords, if firmly eſtabliſhed, a complete explanation of all the phenomena of magnetiſm. At the time it was firſt publiſhed, however, obſervations were neither ſufficiently numerous, nor ſufficiently accurate, to enable the author to aſſign the real poſition of the great magnet, nor to aſcertain its laws of action. The theory was chiefly founded on obſervations made by the dipping needle, and though thoſe inſtruments made by Norman were more accurate than might have been expected at ſo early a period of the ſcience, the obſervations made with them cannot, from many circumſtances, be implicitly relied on. We are ſtill in want of a numerous collection of obſervations on the dip, in order to perfect our knowledge of the magnetic poles. We can only ſay that the earth acts on the compaſs needle in the ſame manner as a large magnet would act; but the appearances do not ſeem to reſemble the effects of what we ſhould conſider as a good loadſtone having two vigorous

Theory. gorous poles, but rather ſuch as would reſult from the action of a very irregular loadſtone with its poles very much diffuſed.

73 It is unfortunate that our moſt numerous obſervations of the dip have not been made in thoſe places where they would be the moſt inſtructive. Dr Robiſon was of opinion that a ſeries of obſervations ſhould be obtained, extending from New Zealand northward, acroſs the Pacific ocean to Cape Fairweather on the weſtern coaſt of North America, whence it ſhould be continued through that part of the continent. A ſecond ſeries might extend from the Cape of Good Hope along the weſtern coaſt of Africa to the tropic of Capricorn; thence acroſs the interior of the African continent through Sicily, Italy, Dalmatia, the eaſtern part of Germany, the gulf of Bothnia, Lapland, and the weſtern part of Greenland. This ſeries would be nearly in a plane paſſing through the probable ſituations of the poles. A third ſeries might extend at right angles to the laſt, ſo as to form a ſmall circle croſſing the former, paſſing near Japan, through the iſland of Borneo, and the weſtern part of New Holland; near Mexico, and a few degrees weſt of Eaſter iſland. Here and at Borneo there would be a conſiderable inclination of the magnetic plane tò the horizon, though this cannot be found out. There are, however, other points of this circle in which the dip is conſiderable, where the inclination may be diſcovered. In ſhort, all circumſtances ſeem to indicate a multiplicity of poles, or what renders calculation moſt difficult, an irregular magnetiſm in which the polarity is very much diffuſed.

Philoſophers are very much divided reſpecting the ſituation of the magnetic poles of the earth. We ſhall here ſtate only a few of their opinions, reſerving a fuller account of ſome of them for the article *VARIATION of the Compaſs*.

74 Opinions reſpecting the ſituation of the magnetic poles. Dr Halley thought that the north magnetic pole was near Baffin's bay in North America.

Profeſſor Krafft (ſee Peterſburgh Comment. vol. xvii.) places the north pole in N. Lat. 72° and W. Long. 23° from London; and the ſouth pole S. Lat. 50°, and E. Long. 92°.

Wilcke of Stockholm places the north pole in N. Lat. 75° near Baffin's bay, and in the longitude of California, while he fixes the ſouth pole in S. Lat. 70° in the Pacific ocean.

Churchman ſuppoſes the north pole to be in N. Lat. 59°, and W. Long. 135°, a little inland from Cape Fairweather; and the ſouth in S. Lat. [illegible], and E. Long. 165°, directly ſouth of New Zealand. (See VARIATION).

Euler (Memoirs of the Acad. of Berlin, vol. xvi.) places the north pole in N. Lat. 75°. Lemounier (*Lois du Magnetiſme*) in N. Lat. 73°. Buffon in N. Lat. 71°.

La Lande places it in N. Lat. 77° 4′, and in about W. Long. 98° from Paris. (See *Connoiſſance des Tems*, an. xii.).

However ingenious this hypotheſis of Dr Gilbert was, it appears to have been nothing more than a ſagacious conjecture. The hypotheſis, however, is confirmed into a rational theory by many obſervations and experiments which were unknown or unthought of in Dr Gilbert's time.

75 Proofs of the truth of the theory. Mr Hindſhaw's beautiful experiment on the effect of an upright iron bar on the oppoſite ends of a magnetic needle, according as one end or the other of the bar is next the earth (see *VARIATION of the Compaſs*) is an abundant proof of the juſtneſs of this theory.

We can imitate that experiment in a very ſatisfactory manner by artificial magnetiſm; thus forming a juſt compariſon between the action of the earth and that of a magnet.

Let a large bar magnet, as SAN (fig. 24.) be ſupported ſo as to have its ends detached from ſurrounding bodies. Then place a ſmall needle nicely poiſed, as B, about three inches below N, the north pole of the magnet, and ſo that its directive power for the magnet may be very weak. Now take a ſmall piece of ſoft iron and hold it in ſuch a poſition as is repreſented at C; its lower end becoming a north pole will attract the ſouth pole of the needle. Now, while the needle is kept in the ſame poſition, turn round the piece of iron into the poſition D; the ſouth pole of the needle will be ſeen to avoid it, and the north pole will be attracted. Here the magnet may be compared to the earth, and the ſmall piece of iron to the iron bar in Mr Hindſhaw's experiment.

Again, it has been ſeen that magnetiſm may be produced in iron or ſteel by hammering or heating them while in a determinate poſition with reſpect to the earth. The ſame effect will be produced by the ſame proceſſes while the iron or ſteel is in the neighbourhood of a powerful magnet.

Laſtly, the circumſtance of the magnetic inclination of the north pole of the dipping needle being diminiſhed, and the horizontality of the compaſs needle deſtroyed, as we aſcend above the earth, is an additional and certain evidence of the truth of this theory.

In ſhort, we may conſider it as demonſtrated, that the earth is a great magnet, or contains a great magnet, by the influence of which the direction of the needle and all the magnetic power acquired by iron, when placed in a proper poſition, are produced.

A further illuſtration and application of this theory will be given preſently, when we have conſidered ſome other hypotheſes poſterior to that of Dr Gilbert.

76 Theories of impulſion. It was very early an object with philoſophers to aſſign the immediate cauſe of magnetic attraction and repulſion, and of that faculty of mutual impregnation which ſo remarkably diſtinguiſhes iron from all other ſubſtances. In particular, the curious arrangement of iron filings ſtrewed round a magnet forcibly attracted their attention. It is ſcarcely poſſible to obſerve this arrangement without conceiving the idea of a ſtream of matter iſſuing from one of the poles of the magnet, moving round it, entering by the other pole, and again iſſuing by its former outlet. Accordingly, ſuch an idea was entertained in the earlieſt times; but very different notions prevailed as to the manner in which ſuch a ſtream produced the effects obſerved. One of the ſimpleſt methods was, to conceive it acting by impulſion, like any other ſtream of fluid matter. This idea was entertained by Lucretius, who ſuppoſed the ſurrounding air to be ſwept out of the way by the impulſion of the fluid, which thus ruſhing round the magnet carried the iron filings towards it.

77 In the laſt century Euler framed an hypotheſis of magnetiſm on this theory of impulſion. He ſuppoſes that the two principal cauſes which concur in producing [illegible]

the wonderful properties of a magnet, are, Firſt, A particular ſtructure of the internal pores of the magnets, and of magnetical bodies; and, Secondly, An external agent or fluid, which acts upon, and paſſes through their pores. This fluid he ſuppoſes to be the ſolar atmoſphere, or that ſubtile matter called *ether*, which fills our ſyſtem.

Indeed, moſt writers on this ſubject agreed in ſuppoſing that there are corpuſcles of a peculiar form and energy, which continually circulate around and through a magnet; and that a vortex of the ſame kind circulates around and through the earth.

"A magnet, beſides the pores which it has in common with other bodies, has alſo other pores conſiderably ſmaller, deſtined only for the paſſage of the magnetic fluid. Theſe pores are ſo diſpoſed as to communicate one with the other, forming tubes or channels, by which the magnetic fluid paſſes from one end to the other. The pores are ſo formed, that this fluid can only paſs through them in one direction, but cannot return back the ſame way; ſimilar to the veins and lymphatic veſſels of the animal body, which are furniſhed with valves for this purpoſe: So that the pores of the magnet may be conceived to be formed into ſeveral narrow contiguous tubes, parallel to each other, as at A, B, fig. 25. through which the finer part of the ether paſſes freely from A to B, but cannot return back on account of the reſiſtance it meets with at *a*, *a*, *b*, *b*, nor overcome the reſiſtance of the groſſer ether, which occaſions and continues the motion. For ſuppoſing the pole A of a magnet, filled with ſeveral mouths or open ends of ſimilar tubes, the magnetic fluid, preſſed by the groſſer parts of the ether, will paſs towards B with an inconceiveable rapidity, which is proportionable to the elaſticity of the ether itſelf; this matter which, till it arrives at B, is ſeparated from the tubes by the groſſer parts, then meets with it again, and has its velocity retarded, and its direction changed; the ſtream, reflected by the ether, with which it cannot immediately mix, is bent on both ſides towards C and D, and deſcribes, but with leſs velocity, the curves DE and CF*e*, and approaching by the curves *d* and *c*, falls in with the effluent matter *m m*, and again enters the magnet; and thus forms that remarkable atmoſphere, which is viſible in the arrangement of ſteel filings on a piece of paper that is placed over a magnet" †.

78 We have already had occaſion (ſee the article IMPULSION) to make ſome obſervations on the general doctrine of impulſion, and theſe need not be here repeated. Reſpecting the explanations afforded by the canals and lock-gates in Euler's hypotheſis, opening in one direction and ſhutting in the other, we may obſerve, that as theſe contructions are altered in a moment in a bar of ſoft iron, merely by changing the poſition of the magnet, it is aſtoniſhing that they ſhould ever have been conceived by ſo acute a philoſopher. Even ſuppoſing ſuch circumſtances to take place, the effects reſulting from them ſhould be the reverſe of what are actually obſerved, as the impelling ſtream ſhould move thoſe bodies leaſt which afford the readieſt channels for its paſſage. If the iron filings were arranged by this impelling ſtream, they ſhould be carried along with it, and if they are carried towards one pole of the magnet, they ſhould be driven away from the other.

79 Theory of Æpinus.

Æpinus, of the academy of Peterſburgh, whoſe theory of electricity we have explained and illuſtrated at conſiderable length, was led by the analogy obſerved between the phenomena of electricity and thoſe of magnetiſm, and in particular from the reſemblance between the attractions and repulſions of the tourmalin and thoſe of a magnet, to conceive the idea that both claſſes of phenomena might be explained in a ſimilar manner, or that the phenomena of magnetiſm, like thoſe of electricity, were to be attributed to the motions of a certain fluid exiſting in all bodies ſuſceptible of magnetiſm. This conjecture was confirmed by obſerving, that when magnetiſm was induced on a piece of iron by its proximity to a magnet, the power of the magnet is not ſenſibly diminiſhed. The following is an abſtract of Mr Æpinus's hypotheſis.

1. There exiſts in all magnetic bodies a ſubſtance which may be called the magnetic fluid, the particles of which repel each other with a force that decreaſes as the diſtance increaſes.

2. There is a mutual attraction, varying according to the ſame law, between the particles of the magnetic fluid, and the particles of iron.

3. There is a mutual repulſion among the particles of iron, following the ſame law.

4. The magnetic fluid is capable of moving through the pores of iron, and ſoft ſteel, without any conſiderable difficulty: but its motion is more and more obſtructed as the ſteel receives a harder degree of temper; and in ſteel of the hardeſt temper, and the ores of iron, it moves with the greateſt difficulty.

5. From the ſuppoſed attraction between the magnetic fluid and iron, the latter may contain a certain determinate quantity of the former, and this quantity will be ſuch that the accumulating attraction of a particle of it for the whole of the iron, balances the repulſion between the particles of the whole fluid contained in the iron; ſuppoſing the quantity of fluid competent to a particle of iron to be ſuch, that the repulſion between it and the fluid competent to another particle of iron, is alſo equal to its attraction for that particle of iron. Therefore the attraction between the fluid in one iron bar A, and the iron of another bar B, is juſt equal to the repulſion between the iron in A and the iron in B. This determinate quantity of fluid in the iron is called its *natural quantity*.

6. From the mobility of the fluid through the pores of iron, it may, by the agency of a proper external force, be abſtracted from one end of an iron bar, and condenſed in the other end. This, however, is a violent ſtate, and the mutual repulſion between the particles of condenſed fluid, together with the attraction between the fluid and that part of the iron which it has quitted, tend to produce a more uniform diſtribution. It is evident that ſomething of this tendency muſt take place in every ſtate of condenſation and rarefaction, and that a perfect equilibrium can be produced only when the fluid is diffuſed with perfect uniformity. This ſtate of uniformity may be called the natural ſtate of the body.

7. The production of ſuch a uniform diſtribution will depend on the nature of the reſiſtance to the motion of the fluid, oppoſed by the iron in its various ſtates. If this reſiſtance ariſes merely from the communication of motion, like that which perfect fluids oppoſe to the motion

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† *Lettres à une Princeſſe d'Allemagne.*

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tion of ſolid bodies, ſuch reſiſtance may be overcome by the weakeſt tendency to uniform diffuſion; but if, as ſeems moſt likely, the obſtruction is like that of a clammy fluid, or of a ſoft plaſtic body like clay, after the accumulation ariſing from the action of an external force, it may remain after that force is removed; and the diffuſion will ceaſe when there is a perfect equilibrium between the obſtruction and the diffuſing force.

As the illuſtration of this theory in general caſes is preciſely ſimilar, *mutatis mutandis*, with that of electricity, ſo fully detailed under the article ELECTRICITY, from N° 299 to 348, we need not repeat it here, but may refer the reader to that treatiſe, requeſting him to conſider the illuſtration as relating to the *magnetic* fluid.

It is proper, however, to remark here, that the phenomena of magnetiſm are limited by this circumſtance; that magnets always contain their natural quantity of fluid. Of courſe, their action on iron, and on each other, depends entirely on its unequal diſtribution.

The moſt important part of this theory is that which explains the induction of magnetiſm on iron and ſteel by juxtapoſition to a magnet: but before we can properly enter on that, we muſt notice ſome other particulars reſpecting the theoretical part of our ſubject.

80 Law of magnetic action.

A very material point in magnetiſm, as in electricity, is to aſcertain the law of action, according to which this power acts on the particles of iron and other matter; and accordingly this has long been an object of attention with philoſophers. The difficulty of aſcertaining this law is extremely great, as will readily appear by the following conſideration.

In the action of two magnets on each other, as A and B, there are four different actions to be conſidered that act at the ſame time, though with different degrees of force, and in different directions. Thus the north pole of A repels the north pole of B, and attracts its ſouth pole, while the ſouth pole of A exerts a repulſion on the ſouth pole of B, and an attraction on its north pole. Now the force, which we attempt to meaſure, is compounded of theſe four forces; and theſe we cannot meaſure ſeparately. The attraction obſerved is the exceſs of two attractions that are unequal above two unequal repulſions, and *v. v.* with reſpect to the obſerved repulſion. Further, if we reflect that it is poſſible for a mutual action to exiſt between every two particles of the different magnets, and that the intenſity of this action may vary, not only at different diſtances, but at the *ſame* diſtance, the difficulty will be greatly increaſed.

81 Experiments of Muſchenbroeck,

Numerous experiments have been made with a view of aſcertaining this law. Mr Cavallo has detailed many of thoſe made by Muſchenbroeck; but their reſults are ſo anomalous, that their inaccuracy is apparent. Indeed, the attempt to aſcertain this law by obſerving merely the attractions and repulſions, was very unphiloſophical.

82 Of Hawkſbee and Dr Brook Taylor,

The method employed by Mr Hawkſbee and Dr Brook Taylor, viz. obſerving how far the action of a magnet made a compaſs needle deviate from the meridian at different diſtances, was much more ſcientific, as this deviation is occaſioned by the difference of the two ſums of the ſame forces; and this may be made many times greater than the other, and muſt of courſe be much more ſenſible. The ſhape of the magnets employed by them was, however, very improper.

83 Of Lambert.

Some experiments made by Mr Lambert of the academy of Berlin, were very judicious. He placed a magnetic needle at various diſtances from a magnet, but in the direction of its axis, and marked the declination from the magnetic line produced by the action of the magnet, and the obliquity of the magnet to the axis of the needle. Thus the action of the magnet and the natural polarity of the needle were placed in oppoſition and equilibrium; but the great difficulty was to diſcover the proportional change of theſe forces by their obliquity of action on this ſmall lever.

Mr Lambert obſerved, that when the obliquity of the magnet to the axis of the needle was $= 30°$, the needle was made to decline $15°$; and when the obliquity was $= 75°$, the needle declined $30°$. Let us call the obliquity o and the declination d, and let us put f for that function of the angle which is proportional to the action. Alſo let us call the natural polarity of the needle p, and the force of the magnet m. Then it is evident that $p \times f : 15 = m \times f : 30$; and $p : m = f, 30 : f, 15$; and for the ſame reaſon $p : m = f, 75 : f, 30$, and therefore $f, 15 : f, 30 = f, 30 : f, 75$. But ſine $15 : 30 =$ ſine $30 : ſ\ 75$; hence Mr Lambert concluded, that the *ſine* was that function of the angle which was proportional to the action of magnetiſm on a lever. As this point, however, could not be determined by one experiment, he compared ſeveral other obliquities and declinations with the ſame diſtances, and with different diſtances of the magnet, and fully proved that he was right in his conjecture.

The reſult of Mr Lambert's experiments fully proves the fallacy of the theories of impulſion, which pretend to explain magnetic action by the impelling power of a ſtream of fluid, or by preſſure produced by the motion of ſuch a ſtream; as in ſuch a caſe the preſſure on the needle muſt have diminiſhed in the duplicate ratio of the ſine; or with the angle 90° the directive power muſt have been four times as much as with the angle of 30°, whereas it is ſhewn by obſervation to be only twice as much.

When Mr Lambert had aſcertained the effect of obliquity, he proceeded to examine that of diſtance; and he found, that if we put f for the force of the magnet, and δ for the diſtance of the neareſt pole of the magnet from the centre of the needle, and a be a conſtant quantity nearly equal to two thirds of the length of the needle, f will be proportional to $\frac{1}{\delta^2 - a^2}$.

84 Of Dr Robiſon's experiments.

Dr Robiſon endeavoured to inveſtigate this law in a very ſimple manner. He cauſed to be made ſome magnets conſiſting of two balls connected by a ſlender rod. By a particular mode of impregnation (which we ſuppoſe to be quenching them, after being made hot, between two magnets) he gave them a pretty good magnetiſm; and the force of each pole appeared to be nearly confined to the centre of the ball, which was his object in making them of ſuch a ſhape, as it reduced the examination of their attractive and repulſive powers to a very eaſy computation. The reſult of his experiments was, that the force of each pole varied inverſely as the ſquares of the diſtances, or at leaſt the error ariſing from ſuch an hypotheſis was very ſmall, amounting only to one-fifteenth of the whole.

Dr Robiſon made a near approximation to the law

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of action, by ſuppoſing that the function of the diſtance expreſſing that law, repreſented by the ordinates of a curve ſimilar to the hyperbola, referred to its aſſymptote as an axis, towards which its curve was of courſe always convex. On this ſuppoſition he explained the attractions and repulſions of magnets nearly in the following manner.

56 [illegible]

Let there be two magnets, A and B (fig. 26.) placed ſo that their four poles, S, N, s, n, may be in a ſtraight line. Now, on the ſtraight line O o take O m, O p, O n, O q, = N s, N n, S s, S n; and let MPNQ be a curve line, whoſe aſſymptotic axis is the ſtraight line O o. Draw the ordinates m M, p P, N n, q Q to the curve, and theſe will repreſent the intenſities of the forces exerted between the poles of the magnets. The diſtance between m, n, or between p and q = the length of the magnet A, and $m\,p$ or $n\,q$ = that of B, and M m, P p, N n and Q q, are pairs of ordinates that are equally diſtant. Now, it is eaſy to ſee from the figure, that in whatever ſituation the pairs of equidiſtant ordinates may be, M m + Q q will always exceed P p + N n, or the ſum of the attractions will be always greater than that of the repulſions.

Let the chords MQ, PN, MP, NQ be drawn. Biſect them in B, D, E, F, and join EF. Draw the ordinates E e, F f, and bDb (cutting EF in C). Draw P u parallel to the axis, cutting E e in ε. Draw alſo Q i parallel to the axis, cutting F f in φ. Alſo draw FHL parallel to the axis, and P o t parallel to QN; and draw PL l, and P e x, cutting M m in l and x. Let each ordinate be repreſented by the letter at its interſection with the axis. Thus, the ordinates M m and Q q may be repreſented by m and q, &c. Becauſe MP is biſected in E, M t is double of E ε, M l is double EL, and M x double of E e. Again, P t being parallel to Q n, and P u to Q i, $t\,u$ equals N i.

If theſe ordinates are ſuppoſed to repreſent the mutual action of the magnetic poles, their tendency to or from each other, that is, their attractions or repulſions, may be expreſſed by $(m+q)-(n+p)$ which repreſent the exceſs of the ſum of the actions of the neareſt and moſt remote poles above the ſum of the action of the intermediate diſtant poles. This tendency may often be conveniently repreſented by $(n-p)-(n-q)$ or the exceſs of the difference of the actions exerted by the neareſt pole of A on the two poles of B, above the difference of the actions of the remote pole of A on the ſame poles of B. Now, 1. If we ſuppoſe the diſſimilar poles of A and B to front each other, $m+q$ will repreſent attractions, and $p+m$ repulſions; but $m+q$ is greater than $p+n$, therefore A and B will attract each other. Again $(m+q)-(p+n)$ equals M t, = 2 E ε = 2 BD = 4 CD.

The above action will be increaſed by any one of four circumſtances, as, 1. By increaſing the ſtrength of either magnet. 2. By leſſening the diſtance between the two magnets. 3. Increaſing the length of A, the diſtance between it and B remaining the ſame. 4. by increaſing the length of B, the diſtance between it and A remaining the ſame.

2dly, Let us place the magnets, ſo that their ſimilar poles front each other. Here it is evident that the ordinates which in the former caſe repreſented attractions will now repreſent repulſions, and that the repelling forces of the magnets are equal to the former attracting forces at the ſame diſtances. As magnets are ſeldom perfect, the repelling forces are, however, uſually weaker than the attracting.

57 Explanation of directive power.

To explain the directive power of magnets, Dr Robiſon ſuppoſed the magnet A not to be at liberty to approach B or recede from it, but to be ſupported at its centre B, ſo as to turn round it. Now, its ſouth pole s being more attracted by N than it is repelled by S, B is on the whole attracted by A, and by this attraction would vibrate like a pendulum ſupported at the centre B. Again, the north pole n being repelled by N more than it is attracted by S, will be on the whole repelled, and B n would alſo vibrate round B. Thus B would be kept in the poſition s B n. This will be more evident if we ſuppoſe the magnet B arranged at right angles to the line AB, as in the dotted repreſentation s' B n'; for now s' and n' are urged in oppoſite conſpiring directions with equal forces, which, if the magnet be very ſmall, will act nearly at right angles to $n'\,s'$. If the poſition were oblique, the forces would be ſomewhat unequal; and allowances muſt be made for the obliquity of the action, that we may know the preciſe rotative momentum. This modification of the action of A on B, we call the directive power of A; and the modification of B, by which it tends to or from A, we call the polarity of B.

Now, the directive power of A and the polarity of B may be increaſed, 1. By increaſing the ſtrength of either A or B, or both; 2. By diminiſhing the diſtance between A and B; 3. By increaſing the length of A; and, 4. By diminiſhing the length of B the diſtance between them remaining the ſame.

We may remark, that the directive power of A is always greater than its attractive power, by a certain meaſure which we may repreſent by the formula $2(p-q)$ which is thus derived. The difference between them may be expreſſed by $t\,l = 2\,\varphi\,L$; but $\varepsilon t = Pp = p$, and $\varepsilon L = Pp - Ff = Pp - Qq - F\varphi = Pp - Qq - \varepsilon t$; therefore $\varphi L = Pp - Qq$, and $t\,l = 2(Pp - Qp) = 2(p-q)$.

58 Curious phenomenon.

This picture of the forces, attentively examined, will ſuggeſt to the reader many intereſting and inſtructive particulars. Dr Robiſon uſed to relate a curious and inſtructive phenomenon that he was long puzzled to explain, reſpecting the mutual action of large magnets. Amuſing himſelf with ſome experiments on magnetiſm, with two large ſtrong magnets, as AB, fig. 27. which were placed at about the diſtance of three inches with their oppoſite poles fronting each other, he had placed a ſmall needle balanced on a point between them as at D, which arranged itſelf in the ſame line with the magnets; but happening to ſet it on to a conſiderable diſtance on the table, as at F, he was ſurpriſed to ſee it inſtantly turn round on the point, and arrange itſelf in an oppoſite direction. When brought back to D, it reaſſumed its former poſition, but when he carried it out gradually along the line DF, perpendicular to N s, he found it grow ſenſibly more feeble, vibrating more ſlowly; and when arrived at a certain point E, it ſhewed no polarity towards either A or B, but retained any poſition given it: but when carried farther out, it again acquired polarity to the magnets, though in a contrary direction, arranging itſelf parallel to N S, with its [illegible]

[illegible]

interrupted in the profecution of this experiment, but having marked the line DF on the table, he afterwards replaced the magnets and needle, placing the latter at E, where he expected it to be neutral; but it now turned its north pole towards B, and did not become neutral till carried further out. When ftanding there, fomething happened to move the magnets A and B, which inftantly rufhed together, and at the fame inftant the needle turned itfelf brifkly, and remained firmly as before at F. In fhort, by gradually withdrawing the magnets from each other, he found that the needle ftill became weaker, then neutral, and then turned into the oppofite pofition.

Dr Robifon explained this curious phenomenon by what he calls primary and fecondary magnetic curves, fuch as NHM, NLL, and SGK, SIL; but our limits do not permit us to enter here on the inveftigation of thefe curves.

[illegible] Law of magnetic action, inverfely as the fquares of the diftances.

From all Dr Robifon's experiments and calculations, he appears to have been fully convinced, that the true law of magnetic action is in the inverfe duplicate ratio *of the diftances*, and his opinion is ftill farther ftrengthened by the ingenious experiments of M. Coulomb related in the *Memoirs of the Academy of Sciences at Paris* for 1785 and 1787, or the *Jour. de Phyf.* vol. xliii.

We are now prepared to examine the induction of magnetifm in iron or fteel by juxtapofition to a magnet, the general facts of which are mentioned and illuftrated in N° 44.

It was remarked in N° 46, that the induction of magnetifm in the iron by being near a magnet was not produced by a transference of fomething from the magnet to the iron. It follows that there muft be fome inherent property in iron, which is only excited, as it were, or roufed into action, by the proximity of the magnet.

It has been remarked, that the magnetifm of iron is momentary, but this muft be underftood only of the fineft and pureft iron, as when this metal is in the ftate of ore, or has undergone any change, as by expofure to the air, or by cementation, its magnetifm becomes permanent, in proportion to the hardnefs of the metal.

[illegible] Induced magnetifm gradual.

It is of great importance to obferve that the acquifition of induced magnetifm is gradual and progreffive, and that this gradation is more perceptible according as the iron is in a harder ftate. In foft iron the induction appears to be inftantaneous throughout, unlefs the bar be exceedingly long; but when a magnet is brought near a bar of tempered fteel, the near end acquires a contrary polarity long before the remote end appears affected, and it is a long time before the remote end acquires the fame polarity with the proximate end of the magnet.

[illegible]

From what has been faid we may infer, that a piece of iron brought near a magnet, is attracted only becaufe it becomes magnetical by induction, and that the attraction of a loadftone for iron, or the tendency of iron to the loadftone, is the confequence of the proper difpofition of the magnetifm induced in the iron. It has already appeared, that this phenomenon arifes from the excefs of two attractions above two repulfions, and this is farther proved by the following confiderations: 1. That the magnetifm of the two poles is evidently of an oppofite nature, the one attracting what the other repels, and vice verfa. If a piece of iron is attracted by one, it ought therefore to be repelled by the other; but each pole, by inducing on the near end of the iron a magnetifm oppofite to its own, and on the remote end a fimilar magnetifm, and its action diminifhing as the diftance increafes, the attraction muft always be in excefs, and the iron muft on the whole be attracted. 2. When we have two magnets placed in a parallel pofition, with their oppofite poles together, if a piece of common iron be brought near their extremities, the different poles counteracting each other, the piece of iron will not be fupported by the two magnets together, unlefs there is an inequality of action; but it is evident that either of them alone would be capable of fupporting the iron. 3. In all the cafes where the induction of magnetifm is flow, the attraction is proportionally weak, and the attraction increafes exactly according to the increafe of the progreffive induction. 4. An ore of iron that is not capable of acquiring magnetifm, is not attracted by the magnet, and on the other hand it is an univerfal fact, that no fubftance which is not attracted by the magnet, can be rendered magnetical.

[illegible] Arrangement of iron filings explained.

The induction of magnetifm by juxtapofition affords a complete explanation of the curious arrangement of iron filings round a magnet. Let us fuppofe a great many fmall oblong pieces of iron to be lying near each other on the furface of mercury, and that a ftrong magnet be brought into the midft of them. They are all immediately rendered magnetical by induction; any one that is neareft the north pole of the magnet acquiring two poles, one a north and the other a fouth pole, turns the fouth pole towards the north pole of the magnet, and the north pole away from it; a fimilar effect is produced on another piece or filing that lies near the firft, and fo on of the reft. All thofe that lie near each other muft mutually attract, as the magnetifm of each is fo difpofed that both ends of it are in a ftate of attraction towards one or other of its neighbours. They will therefore arrange themfelves by coalefcence in a particular manner; if they are near enough, they will unite by their extremities, and if they are at fome diftance they will point towards each other, forming curved lines.

[illegible] Magnetifm reverfed.

It is found that the magnetifm of magnets, whether natural or artificial, is continually tending to decay. Now as we find that this magnetifm may be induced merely by the approach of a magnet, and as we know that in producing magnetifm, magnets may oppofe each other, it is reafonable to conclude, that when a flight though permanent magnetifm has been acquired by a piece of iron by its vicinity to a magnet, it may be deftroyed, and the contrary magnetifm induced, by applying a magnet in the oppofite direction. Accordingly it is a well-known fact, that the poles of magnets made of foft fteel can be reverfed at pleafure.

This explains why magnetic repulfion is always weaker than attraction at the fame diftance, as magnets, when placed with their fimilar poles fronting each other, in order to try their repulfion, are thereby weakened; whereas, on the contrary, magnets applied with their oppofite poles, fo as to attract each other, are thereby improved, and their attractive powers are made to appear greater than they really are.

It has been obferved that a magnet is not weakened by inducing magnetifm on iron. In fact, it is rather

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improved by such induction, and this will increase the effect: for as the magnet is improved, the induced magnetism of the iron will be thereby increased, and thus the magnet will be thus further improved.

After what has been said, we need not enter further into an examination of the phenomena, or of the processes employed in making artificial magnets. They are all referable to this one fact of the induction of magnetism by juxtaposition, and explanations will readily suggest themselves to readers who carefully consider the preceding facts, and compare them with Dr Gilbert's theory of terrestrial magnetism.

94 Objection to terrestrial magnetism answered.

It is now time for us to return to Dr Gilbert's hypothesis, and consider an objection that has been strongly urged against it.

There is obſerved no tendency in the magnetic needle towards the great terreſtrial magnet, that is, though, when made to float on water, it ſpeedily acquires directive power, it does not in theſe latitudes approach the north ſide of the veſſel, nor does an iron bar appear heavier when its ſouth pole is uppermoſt, as ought to be the caſe on account of the attraction of the great magnet. Dr Gilbert ſaw this objection, and it appears to have given him ſome concern. He attempted to get rid of it by obſerving that the directive power of a magnet is greater than its attractive force; a fact in ſupport of which he brings many experiments. A much more ſatisfactory anſwer may be derived from what has been ſtated reſpecting the actions of the four poles. We thence find, that the polarity of the needle depends on the difference of the *ſums* of the actions of each pole of the magnet on both poles of the needle; whereas its tendency towards the magnet ariſing from the attraction between them, depends on the difference of the *differences* of the ſame actions. Hence the former may be very great while the latter is very ſmall. We find that ſmall iron filings are much leſs forcibly attracted by magnets than coarſe ones, and, if we conſider that the largeſt magnets which we employ do not bear ſo great a proportion to the earth, as the fineſt iron filings to an ordinary magnet, we ſhall not wonder that the attractive power of the earth is not very ſenſible.

As this objection is one of the ſtrongeſt that can be brought againſt the theory, and as we may conſider this as done away, we may now receive the theory as juſt ſo far as it goes. We muſt remark, that though we call that pole of a magnet which inclines towards the earth in the northern latitudes, a *north* pole, it is properly ſpeaking a *ſouth* pole; for as we muſt call that pole of the *great* magnet the north pole which is in the north, and as this pole produces the contrary polarity in the proximate end of a needle, that end muſt be poſſeſſed of *ſouth* polarity. We ſhall return to this ſubject in the article VARIATION.

Some valuable obſervations on terreſtrial magnetiſm have lately been made in France by M. M. Humboldt and Biot, and as they would ſuffer materially by abridgement, we ſhall preſent our readers with the greateſt part of the memoir nearly as tranſlated in the Philoſophical Magazine, vol. xxii.

95 Observations of Humboldt and Biot.

After explaining the object of the memoir, and giving an account of the ſhare that he had in conducting the obſervations, M. Biot proceeds as follows.

It is neceſſary to conſider the action of terreſtrial magnetiſm under different points of view, correſponding to the different claſſes of the phenomena which it produces.

96 Magnetiſm act on the whole ſurface of the globe.

If we conſider it firſt in general, we find that it acts on the whole ſurface of the globe, and that it extends beyond it. This fact, which was doubted, has been lately proved by M. Guy-Luſſac, during his two aeroſtatic voyages. And if theſe obſervations, made with all the care poſſible, have not ſhewn the leaſt ſenſible diminution in the intenſity of the magnetic force, at the greateſt height to which man can attain, we have a right to conclude that this force extends to an indefinite diſtance from the earth, where it decreaſes, perhaps, in a very rapid manner, but which at preſent is unknown to us.

If we now conſider magnetiſm at the ſurface even of the earth, we ſhall find three grand claſſes of phenomena which it is neceſſary to ſtudy ſeparately, in order to have a complete knowledge of its mode of action. Theſe phenomena are, the declination of the magnetic needle, its inclination, and the intenſity of the magnetic force, conſidered either comparatively in different places or in themſelves, paying attention to the variations which they experience. It is thus that, after having diſcovered the action of gravity as a central force, its variation, reſulting from the figure of the earth, was afterwards aſcertained in different latitudes.

The declination of the magnetic needle appears to be that phenomenon which hitherto has more particularly fixed the attention of philoſophers, on account, no doubt, of the aſſiſtance which they hoped to derive from it in determining the longitude; but when it was known that the declination changes in the ſame place, in the courſe of time, when its diurnal variations were remarked, and its irregular traverſing occaſioned by different meteors, in a word, the difficulty of obſerving it at ſea, within one degree nearly, it was neceſſary to abandon that hope, to conſider the cauſe of theſe phenomena as much more complex and abſtruſe than had been at firſt imagined.

97 Magnetic power increaſes from the equator to the poles.

In regard to the intenſity of the magnetic power in different parts of the earth, it has never yet been meaſured in a comparative manner. The obſervations of M. Humboldt on this ſubject have diſcovered a very remarkable phenomenon; it is the variation of the intenſity in different latitudes, and its increaſe proceeding from the equator to the poles.

The compaſs, indeed, which at the departure of M. Humboldt gave at Paris 245 oſcillations in 10 minutes, gave no more in Peru than 211, and it conſtantly varied in the ſame direction; that is to ſay, the number of the oſcillations always decreaſed in approaching the equator, and always increaſed in advancing towards the north.

Theſe differences cannot be aſcribed to a diminution of the force in the magnetiſm of the compaſs, nor can we ſuppoſe that it is weakened by the effect of time and of heat; for after three years reſidence in the warmeſt countries of the earth, the ſame compaſs gave again in Mexico oſcillations as rapid as at Paris.

There is no reaſon to doubt the juſtneſs of M. Humboldt's obſervations, for he often obſerved the oſcillations in the vertical plane perpendicular to that meridian; and by decompoſing the magnetic force in the latter plane, and comparing it with its total action, which is exerciſed in the former, we may from theſe data calculate its direction, and conſequently the direction of the needle (c). This inclination, thus calculated, is found always conformable to that which M. Humboldt obſerved directly. When he made his experiments, however, he could not foreſee that they would be ſubjected to this proof by which M. Laplace verified them.

As the juſtneſs of theſe obſervations cannot be conteſted, we muſt allow alſo the truth of the reſult which they indicate, and which is the increaſe of the magnetic force proceeding from the equator to the poles.

98
Humboldt's determination of the magnetic equator.

To follow theſe reſults with more facility, it will be proper to ſet out from a fixed term; and it appears natural to make choice for that purpoſe of the points where the inclination of the magnetic needle is null, becauſe they ſeem to indicate the places where the oppoſite action of the two terreſtrial hemiſpheres is equal. The ſeries of theſe points forms on the ſurface of the earth a curved line, which differs very ſenſibly from the terreſtrial equator, deviating from it to the ſouth of the Atlantic ocean, and to the north in the ſouth ſea. M. Humboldt found this equator in Peru about 7° 1′ S. Lat. which for that part of the earth places it nearly in the ſpot where Wilke and Lemounier had fixed it.

The places ſituated to the north of that point may be divided into four zones, the three firſt of which, being nearer the equator, are about 4° of latitude, while the latter, more extenſive and more variable, is 14°. So that the ſyſtem of theſe zones extends in America from the magnetic equator to 23° of north latitude, and comprehends in longitude an interval of about 50°.

The firſt zone extends from 7° 1′ of ſouth latitude to 2° 54′. The mean number of the oſcillations of the needle in the magnetic meridian in 10′ of time is there 211,9: no obſervation gives leſs than 211, or more than 214. From M. Humboldt's obſervations one might form a ſimilar zone on the ſouth ſide of the magnetic equator, which would give the ſame reſults.

The ſecond zone extends from 2° 13′ of ſouth latitude to 3° 15′ of north latitude. The mean term of the oſcillations is there 217.9: they are never below 220, nor above 226.

The fourth zone, broader than the other two, extends from 9° 15′ to 23° 8′ of north latitude. Its mean term is 237: it never preſents any obſervation below 229, nor above 240.

We are unacquainted, in regard to this part of the earth with the intenſity of the magnetic force beyond the latitude of 23° north; and on the other hand, in Europe, where we have obſervations made in high latitudes, we have none in the neighbourhood of the equator; but we will not venture to compare theſe two claſſes of obſervations, which may belong to different ſyſtems of forces, as will be mentioned hereafter.

However, the only compoſition of reſults, collected in America by M. Humboldt, appears to us to eſtabliſh with certainty the increaſe of the magnetic force from the equator to the poles; and, without wiſhing to connect them too cloſely with the experiments made in Europe, we muſt rema.k, that the latter accord ſo far alſo with the preceding as to indicate the phenomenon.

If we have thus divided the obſervations into zones parallel to the equator, it is in order that we may more eaſily ſhew the truth of the fact which reſults from them, and in particular to render the demonſtration independent of thoſe ſmall anomalies which are inevitably mixed with theſe reſults.

Though theſe anomalies are very trifling, they are however, ſo ſenſible, and ſo frequently occur, that they cannot be aſcribed entirely to errors in the obſervations. It appears more natural to aſcribe them to the influence of local circumſtances, and the particular attractions exerciſed by collections of ferruginous matters, chains of mountains, or by the large maſſes of the continents.

One of them, indeed, having carried to the Alps the magnetic needle employed in an aërial excurſion, he found that its tendency to return to the magnetic meridian was conſtantly ſtronger in theſe mountains than it was at Paris before his departure, and than it has been found ſince his return. This needle, which made at Paris 83.9° in 10′ of time, has varied in the following manner in the different places to which it was carried.

(c) Let HOC (fig. 28.) be the plane of the magnetic meridian paſſing through the vertical OC; let OL be the direction of the needle ſituated in that plane, and OH a horizontal. The angle LOH will be the inclination of the needle, which we ſhall denote by I. If F repreſent the total magnetic force which acts in the direction OL, the part of this force which acts according to OC, will be F ſine of I: but the magnetic forces which determine the oſcillations of the needle in any plane, are to each other as the ſquares of the oſcillations made in the ſame time. If we denote them by M, the number of oſcillations made in 10′ of time in the magnetic meridian, and by P, the number of oſcillations made alſo in 10′, in the perpendicular plane, we ſhall have the following proportion:

$$\frac{\text{F ſin. I}}{\text{F}} = \frac{\text{P}^2}{\text{M}^2}$$

from whence we deduce

$$\text{Sin. I} = \frac{\text{P}^2}{\text{M}^2}.$$

The inclination then may be calculated by this formula when we have oſcillations made in the ſame plane.

In like manner, by making a needle oſcillate ſucceſſively in ſeveral vertical planes, we might determine the direction of the magnetic meridian.

Places of Observation.	*Number of Oscillations in 10′ of Time.*
Paris, before his departure, -	83.9
Turin, - -	87.2
On Mount Genevre, -	88.2
Grenoble, - -	87.4
[illegible] - -	87.3
Geneva, - -	86.5
Dijon, - -	84.5
Paris, on his return, - -	83.9

99 [illegible] local circumstances. These experiments were made with the greateſt care, particularly with excellent obſervers, and always employing the ſame watch verified by ſmall pendulums, and taking the mean terms between ſeveral ſerieſes of obſervations, which always differed very little from each other. It appears thence to reſult, that the action of the Alps has a ſenſible influence on the intenſity of the magnetic force. M. Humboldt obſerved analogous effects at the bottom of the Pyrenees; for example, at Perpignan. It is not improbable that they aroſe from the maſs of theſe mountains, or the ferruginous matters contained in them: but whatever may be the cauſe, it is ſeen by theſe examples that the general action of terreſtrial magnetiſm is ſenſibly modified by local circumſtances, the differences of which may be perceived in places very little diſtant from each other. This truth will be further confirmed by the following obſervations.

It is to cauſes of this kind, no doubt, that we muſt aſcribe the diminution of the magnetic forces obſerved in ſome mountains; a diminution which, on the firſt view, might appear contrary to the reſults obtained during various aërial voyages. This conjecture is ſupported by ſeveral obſervations of M. Humboldt. By making his needle to oſcillate on the mountain of Guadaloupe, which riſes 338 toiſes above Santa-Fé, he found it in 10′ of time give two oſcillations leſs than in the plain. At Silla, near Caracas, at the height of 1316 toiſes above the coaſt, the diminution went ſo far as five oſcillations; and on the other hand, on the volcano of Antiſana, at the height of 2467 toiſes, the number of oſcillations in 10 minutes was 230; though at Quito it was only 218, which indicates an increaſe of intenſity. A ſimilar effect was obſerved on the ſummit of Mount Genevre, at the height of 800 or 900 toiſes, as may be ſeen from the numbers already given; and on this mountain M. Biot found the greateſt intenſity of the magnetic force. He ſaw on the hill of La Superga, in the neighbourhood of Turin, an example of theſe variations equally ſtriking. Obſerving, with Vaſſali, on this hill, at the elevation of 300 toiſes, they found 87 oſcillations in 10 minutes of time. On the ſide of the hill they had 88.8 oſcillations, and at the bottom, on the bank of the Po, they obtained 87.3. Though theſe reſults approach very near to each other, their difference is, however, ſenſible, and fully ſhews that their ſmall variations muſt be conſidered as ſlight anomalies produced by local circumſtances.

This examination leads us to conſider the intenſity of magnetiſm on the different points of the ſurface of the globe, as ſubject to two ſorts of differences. One kind are general; they depend merely on the ſituation of the places in regard to the magnetic equator, and belong to a general phenomenon, which is the increaſe of the intenſity of the magnetic forces in proportion as we remove from the equator; the other kind of variations, which are much ſmaller and altogether irregular, ſeem to depend entirely on local circumſtances, and modify either more or leſs the general reſults. Theory.

If we conſider terreſtrial magnetiſm as the effect of an attractive force inherent in all the material particles of the globe, or only in ſome of theſe particles, which we are far from determining, the general law will be, the total reſult of the ſyſtem of attraction of all the particles, and the ſmall anomalies will be produced by the particular attractions of the partial ſyſtems of the magnetic moleculæ diffuſed irregularly around each point; attractions rendered more ſenſible by the diminution of the diſtance.

It now remains to conſider the inclination of the magnetic needle in regard to the horizontal plane. It has been long known that this inclination is not every where the ſame; in the northern hemiſphere the needle inclines towards the north; in the ſouthern towards the ſouth; the places where it becomes horizontal form the magnetic equator; and thoſe where the inclination is equal, but not null, form on each ſide of that equator curved lines, to which the name of magnetic parallels has been given, from their analogy to the terreſtrial parallels. One may ſee in ſeveral works, and particularly in that of Lemounier, entitled *Lois du Magnetiſme*, the figure of theſe parallels, and their diſpoſition on the face of the earth. 100

Inclination of the needle increaſes as we proceed from the magnetic equator. It evidently reſults from this diſpoſition, that the inclination is in proportion as we recede from the magnetic equator; but the law which it follows in its increaſe, has not yet, as far as appears to us, been given. To aſcertain this law, however, would be of great utility; for the inclination ſeems to be the moſt conſtant of all the magnetic phenomena, and it exhibits much fewer anomalies than the intenſity. Beſides, if any rule well confirmed could be diſcovered on this ſubject, it might be employed with advantage at ſea to determine the latitude, when the weather does not admit an obſervation of the ſun; which is the caſe in various places during the greater part of the year. We have ſome reaſon to expect this application, when we ſee the delicacy of that indication in the obſervations of M. Humboldt, where we find 35′ 6″ of difference between two towns ſo near each other as Niſmes and Montpellier. Theſe motives have induced us to ſtudy with great intereſt the ſeries of obſervations made by M. Humboldt in regard to the inclination; and it appears to us that they may be repreſented very exactly by a mathematical hypotheſis, to which we are far from attaching any reality in itſelf, but which we offer merely as a commodious and ſure mode of connecting the reſults.

To diſcover this law, we muſt firſt exactly determine the poſition of the magnetic equator, which is as an intermediate line between the northern and the ſouthern inclinations. For this purpoſe we have the advantage of being able to compare two direct obſervations, one of La Perouſe, and the other of M. Humboldt. The former found the magnetic equator on the coaſts of Brazil at 10° 57′ of ſouth latitude, and 25° 23′ of weſt longitude, counted from the meridian of Paris. The latter found the ſame equator in Peru at 7° 1′ of ſouth latitude, and 80° 41′ of weſt longitude, alſo reckoning from the ſame meridian. Theſe data are ſufficient to fix exactly the poſition of the magnetic equator, ſuppoſing it to be a great circle of the terreſtrial ſphere; an hypotheſis which appears to be conformable to the obſervations. The inclination of this plane to the terreſtrial equator is found to be equal to 10° 58′ 36″, and its occidental node, or that of the equator, is at 120° 2′ 5″ weſt from Paris, which places it a little beyond the continent of America, near the Gallipagos, in the South ſea; the other node is at 59° 57′ 55″ to the eaſt of Paris, which places it in the Indian ſeas. (D)

"We do not give this determination as rigorouſly exact; ſome corrections might no doubt be made to it, had we a greater number of obſervations equally preciſe; but we are of opinion that theſe corrections would be very ſmall, and it will be ſeen afterwards that, independently of the confidence which the two obſervations we have employed deſerve, we have other reaſons for entertaining this opinion. (E)

"It is very remarkable that this determination of the magnetic equator agrees almoſt perfectly with that given long ago by Wilke and Lemounier. The latter in particular, who for want of direct obſervations had diſcuſſed a great number of correſponding obſervations, indicates the magnetic equator in Peru towards 7° 20′ of ſouth latitude, and M. Humboldt found it in the ſame place at 7° 1′: beſides, Lemonnier's chart, as well as that of M. Wilke, indicates for the inclination of the magnetic meridian about 11°, and they place the node about 140° of weſt longitude, reckoned from the meridian of Paris.

"Can it be by chance, then, that theſe elements, found more than 40 years ago, ſhould accord ſo well with ours founded on recent obſervations? or does the inclination of the magnetic equator experience only very ſmall variations, while all the other ſymptoms of terreſtrial magnetiſm change ſo rapidly? We ſhould not be far from admitting the latter opinion, when we conſider that the inclination of the magnetic needle has changed at Paris 3° in 60 years ſince it has been obſerved; and that at London, according to the obſervations of M. Graham, it has not changed 1° in 200 years, while the declination has varied more than 20° in the ſame interval, and has paſſed from eaſt to weſt; but on the other hand the obſervation of the inclination is ſo difficult to be made with exactneſs, and it is ſo ſhort a time ſince the art of meaſuring it with preciſion was known, that it is perhaps more prudent to abſtain from any premature opinion on phenomena, the cauſe of which is totally unknown to us."

To employ the other obſervations of M. Humboldt in regard to the inclination, the terreſtrial latitudes and longitudes reckoned from the magnetic equator were firſt reduced. The latter, being reckoned from the node of that equator in the South ſea, M. Biot firſt perceived by theſe calculations that the poſition of that plane determined by preceding reſearches was pretty exact; for ſome of the places, ſuch as Santa-Fé and Javita, where M. Humboldt obſerved inclinations almoſt equal, were found nearly on the magnetic parallel, though diſtant from each other more than 60° of longitude.

When theſe reductions were made, M. Biot endeavoured to repreſent the ſigns of the inclinations obſerved, and to leave as little to chance as poſſible. He firſt tried a mathematical hypotheſis conformable enough to the idea which has hitherto been entertained in regard to terreſtrial magnetiſm.

He ſuppoſed in the axis of the magnetic equator, and at an equal diſtance from the centre of the earth, two centres of attractive forces, the one auſtral and the other boreal, in ſuch a manner as to repreſent the two oppoſite magnetic poles of the earth. He then calculated the effect which ought to reſult from the action of

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(D) To calculate this poſition, let NEE′ (fig. 29.) be the terreſtrial equator; NHL the magnetic equator, ſuppoſed alſo to be a great circle, and HL the two points of that equator, obſerved by Meſſrs Humboldt and La Perouſe. The latitudes HE, LE′, and the arc EE′, which is the difference of longitude of theſe two points, is known; conſequently, if we ſuppoſe $HE=b$, $LE'=b'$, $EE'=v$, $EN=x$, and the angle $ENH=y$, we ſhall have two ſpherical triangles NEH, NE′L, which will give the two following equations:

$$\text{ſin. } x=\frac{\text{tang. } b \text{ cot. } y}{R} \quad \text{ſin. } (x+v)=\frac{\text{tang. } b' \text{ cot. } y}{R};$$

from which we deduce

$$\frac{\text{ſin. } (x+v)}{\text{ſin. } x}=\frac{\text{tang. } b}{\text{tang. } b'},$$

and developing

$$\text{cot. } x=\frac{\text{tang. } b \text{ ſin. } v}{\text{tang. } b'}-\frac{\text{coſ. } v}{\text{ſin. } v}.$$

Let us now take an auxiliary angle φ, ſo that we may have

$$\text{tang. } \varphi=\frac{\text{tang. } b \text{ ſin. } v}{\text{tang. } b'}, \text{ and we ſhall have}$$

$$\text{tang. } x=\frac{\text{ſin. } v \text{ ſin. } \varphi}{\text{ſin. } (v-\varphi)}.$$

By theſe equations we may find x, and then y, by any of the firſt two.

(E) La Perouſe, after having doubled Cape Horn, fell in a ſecond time with the magnetic equator in 18′ north latitude, and 119° 7′ of longitude weſt from Paris. He was therefore very near the node of the magnetic equator, ſuch as we have deduced it from obſervations. This fact eſtabliſhes in a poſitive manner two important conſequences: Firſt, that the preceding determination requires only very ſlight corrections; and the ſecond, that the magnetic equator is really a great circle of the earth, or at leaſt very nearly.

Theory. of theſe centres in any point of the ſurface of the earth, making their attractive force reciprocally vary as the ſquare of the diſtance; and in this manner he obtained the direction of the reſult of their forces, which ought to be that alſo of the magnetic needle in that latitude.

He ſuppoſes that the point B (fig. 30.) is the north magnetic pole of the earth, and that the point A is the ſouth magnetic pole; he ſuppoſes alſo that there is in the point M, at the ſurface of the earth, a molecula of the neutral fluid which is attracted by B and repelled by A in the inverſe ratio of the ſquare of the diſtance; and he requires what will be the direction of the power reſulting from theſe two forces acting on that molecula. It is evident that this direction will be that alſo which would be aſſumed in the point M by the needle of a compaſs freely ſuſpended; for, in conſequence of the ſmallneſs of the needle in compariſon of the radius of the earth, the lines drawn from its points to one centre, B or A, may be conſidered as parallel, eſpecially if the points A and B are near the centre of the earth, which is the caſe with nature, as may be ſeen.

He firſt ſuppoſes that the earth has a ſpherical figure, and that the two poles A and B are equal in force, and he then examines how far the latter ſuppoſition agrees with the reſults obſerved.

Let AM then $=D'$, $BM=D$, $CP=x$, $PM=y$, the angle $MCP=u$, $CA=CB=a$. He then makes $a=Kr$, r being $=$ the radius of the earth, and K a conſtant but indeterminate quantity.

Let X, Y, alſo be the forces which attract M in the direction of the axes of the co-ordinates, and β the angle which the reſulting force makes with the axis ABC.

He then gives the following equations, in which F is the magnetic force, at a diſtance equal to unity. Theory.

$$x=\frac{F}{D^2}\,\text{coſ. MBD}-\frac{F}{D'^2}\,\text{coſ. MAD};$$

$$D'^2=y^2+(x+a)^2=r^2+2\,\text{axis}+a^2,$$

$$Y=\frac{F}{D^2}\,\text{ſin. MBD}-\frac{F}{D'^2}\,\text{ſin. MAD};$$

$D^2=y^2+(x-a)^2=r^2-2\,\text{axis}+a^2$, or, by putting for the coſines their values:

$$X=\frac{F(x-a)}{D^3}-\frac{F(x+a)}{D'^3}$$

$$Y=\frac{Fy}{D^3}-\frac{Fy}{D'^3},$$

and as we have

$$\text{tang. }\beta=\frac{Y}{X},$$

we ſhall have alſo

$$\text{tang. }\beta=\frac{\frac{Y}{D^3}-\frac{Y}{D'^3}}{\frac{x-a}{D^3}-\frac{x+a}{D^3}}=\frac{y(D'^3-D^3}{(D^3-D^3)-a(D'^3+D^3)};$$

and by putting for x, y and a, their values, coſ. u; r ſin. u, Kr;

$$\text{tang. }\beta=\frac{\text{ſin. }u}{\text{coſ. }u-K\left(\frac{D'^3+D^3}{D'^3-D^3}\right)},$$

$$D'^2=r^2(1+2K\,\text{coſ. }u+K^2);$$

$$D^2=r^2(1-2K\,\text{coſ. }u+K^2);$$

which gives the ſyſtem of the two equations,

$$\text{tang. }\beta=\frac{\text{ſin. }u}{\text{coſ. }u-K\left(\frac{D^3+D^3}{D'^3-D^8}\right)},$$

$$K\left(\frac{D'^3+D^3}{D^3-D^3}\right)=\frac{(1+2K\ \text{coſ. }u+K^2)^{\frac{3}{2}}+(1-2K\ \text{coſ. }u+K^2)^{\frac{3}{2}}}{(1+2K\ \text{coſ. }u+K^2)^{\frac{3}{2}}-(1-2K\ \text{coſ. }u+K)^{\frac{3}{2}}}K.$$

Theſe equations determine the direction of the magnetic needle in regard to each point M, the diſtance of which from the magnetic equator is known; but it is ſeen that this direction depends on the quantity K, which repreſents the diſtance of the magnetic centres from the centre of the earth; this diſtance being expreſſed in parts of the terreſtrial radius, we muſt therefore firſt determine this quantity from obſervations.

To do it in the manner of approximation, and thus acquire a firſt idea of the value of K, M. Biot choſe an obſervation made by M. Humboldt at Carichana in 6° 34′ 5″ of north latitude counted from the terreſtrial equator, and 70° 18′ weſt longitude reckoned from the meridian of Paris, which gives 14° 52′ 25″ of longitude counted from the magnetic equator, and 48° 51′ 53″ of weſt longitude, proceeding from the node formed by that equator with the equator of the earth. The inclination of the magnetic needle was obſerved in that place by M. Humboldt in the month of Meſſidor, year 8, and found to be equal to 33,78° of the centigrade diviſion. A compariſon of this reſult with the other obſervations of M. Humboldt, ſhews that it may indeed be conſidered as agreeing to that latitude.

To make uſe of it, M. Biot ſucceſſively gave to K different values in the formula; he calculated the inclinations reſulting from that latitude; and comparing theſe reſults with that which M. Humboldt really obſerved, the progreſs of the errors naturally led him to the moſt proper ſuppoſition. The following is a table of theſe trials.

Value of K.	Inclinations of the Needle.	Errors.
K=1	7.73°	26.04
K=0.6	18.80	14.97
K=0.5	22.04	11.73
K=0.2	29.38	4.39
K=0.1	30.64	3.13
K=0.01	31.04	2.73
K=0.001	31.07	2.7

The firſt value of K would place the centre of the magnetic forces at the ſurface of the earth and the poles of the magnetic equator. It is ſeen that this ſuppoſition cannot be admitted, becauſe it would give an increaſe of inclination much leſs rapid than that indicated by obſervations. The caſe is the ſame with the following

Theory. following reſults, which place the centres of action on the terreſtrial radius at different diſtances from the centre of the earth; but it is ſeen alſo in general, that they approach more and more to the truth in proportion as this diſtance becomes leſs; which evidently ſhews that the two centres of action of the magnetic forces are ſituated near the centre of the earth. All the other obſervations of M. Humboldt would alſo lead to the ſame conſequence.

The moſt proper ſuppoſition would be to make K null, or ſo ſmall that it would be needleſs to pay attention to it; which amounts to the ſame thing as to conſider the two centres of action placed, as we may ſay, in the ſame molecula. The reſult, indeed, obtained in this manner is the moſt exact of all; it is $=31.0843^\circ$; this value is ſtill a little leſs than that which M. Humboldt obſerved, and the difference is $=2.69$; but it muſt be conſidered alſo that the formula from which we derive theſe values ſuppoſes the poſition of the magnetic equator is perfectly determined; but it may not be ſo with the utmoſt exactneſs, according to the two only obſervations of La Perouſe and Humboldt, which we have employed. It is therefore by ſtudying the progreſs of the formula, and comparing it with the obſervations, that we are able to appreciate it juſtly; after which we may think of remedying the ſmall errors with which it may be accompanied.

To obtain the reſult here mentioned, and which is, as it were, the limit of all thoſe which may be obtained by giving to K different values, it is to be remarked that the quantity

$$K\left(\frac{D'^3+D^3}{D'^3-D^3}\right),$$

or,

$$K\frac{(1+2K\ \text{coſ.}\ u+K^2)^{\frac{3}{2}}+(1-2K\ \text{coſ.}\ u+K^2)^{\frac{3}{2}}}{(1+2K\ \text{coſ.}\ u+K^2)^{\frac{3}{2}}-(1-2K\ \text{coſ.}\ u+K^2)^{\frac{3}{2}}}$$

becomes $\frac{0}{0}$ when K is null; but by applying to it the methods of known quantities, it will be found that its value in this ſuppoſition is really determinate and $=\frac{1}{3\ \text{coſ.}\ u}$. By ſubſtituting this in the formula we ſhall have

$$\text{tang.}\ \beta=\frac{\text{ſin.}\ u}{\text{coſ.}\ u-\frac{1}{3\ \text{coſ.}\ u}}$$

an equation which may be reduced to this form:

$$\text{tang.}\ \beta=\frac{\text{ſin.}\ 2u}{\text{coſ.}\ 2u+\frac{1}{3}};$$

which will eaſily give the value of β; and when this value is known, we ſhall have the inclination I, by the following formula:

$$I=100+u-\beta,$$

which will ſerve throughout the whole extent of the two hemiſpheres.

From the progreſs thus traced out, it is ſeen that the preceding formula is not merely an empyric conſtruction of obſervations; on the contrary, it is totally independent, and only ſuppoſes the inclination of the magnetic needle to be produced by a magnet infinitely ſmall, placed in the centre of the terreſtrial ſpheroid; but by calculating from this formula the inclinations for the different latitudes, M. Biot found preciſely the ſame numbers as M. Humboldt obſerved either in Europe or America; and it is not his obſervations only that are repreſented in this manner; but thoſe which have been made in Ruſſia, and at Kola in Lapland, during the laſt tranſit of Venus, are alſo comprehended under the ſame law.

It is ſeen that the reſults of the formula deviate very little from the obſervations; but theſe differences may be rendered ſtill ſmaller. By examining, indeed, the progreſs of the errors, it is ſeen that the numbers given by calculation are a little too ſmall in America for the low latitudes, and a little too great for the high latitudes, which ſhews that the whole may be allowed, with ſome ſlight modifications, either by changing, however little, the node and inclination of the magnetic equator, which two obſervations cannot determine with the utmoſt exactneſs, or by diſplacing ever ſo little our ſmall magnet, leaving, however, its centre in the plane of the magnetic equator, and placing it in ſuch a manner that it ſhall be a little nearer America than Europe. It is by theſe obſervations themſelves, when we ſhall have a greater number, that we muſt be guided in theſe ſmall corrections.

In a word, it muſt not be expected that we can repreſent in a rigorous manner, by a mathematical law, all the inclinations obſerved; for the phenomenon of the inclination, though more regular than the other magnetic effects, is not free from ſome anomalies; this may be eaſily ſeen on conſtructing the curve given by the obſervations themſelves. Thus, for example, the inclination obſerved at Popayan is 2° 10′ greater than at St Carlos del Rio Negro, though the magnetic latitude of the latter is 3° 7′ greater. The caſe is the ſame with obſervations made at Javita and Santa Fé. Other anomalies are diſcovered in the comparative progreſs of the obſervations and formula. This is the caſe in regard to Carichana, St Thomas de la Guyane, and Carthagena. The increaſe of the inclination from the firſt to the ſecond of theſe points is by no means in harmony with the increaſe from the ſecond to the third; and if we compare together the intenſities obſerved in theſe different places, the anomalies they exhibit announce in ſome meaſure thoſe which the inclination ought to experience.

The cauſe of theſe anomalies becomes evident from what has been already remarked; they are merely the effect of local circumſtances, and ariſe from the ſmall ſyſtems of attraction by which the general phenomena are modified. This muſt be ſenſible in particular for that part of America which M. Humboldt travelled over, and which is traverſed throughout its whole length by the grand chain of the cordillera of the Andes. It is alſo in theſe places that the moſt conſiderable differences exiſt. Popayan, for example, is ſituated near the volcanoes of Sotara and Pourace; it is joined to baſaltic mountains abounding with magnetic iron. Near Sulumito, to the eaſt of Popayan, theſe baſaltic columns have very ſtriking poles: in like manner Mexico is ſituated at the height of 1160 toiſes on the ridge of the grand cordillera of Lenſchtitlan; the ground there is covered with porous baſaltes and amyg-

daloids

[illegible], which are filled all charged with magnetic iron. Might not all these bodies have a sensible influence on the inclination of the magnetic needle; and may not the different diſpoſitions of the ferruginous matters, or their changes of ſtate, in conſequence of the action of nature, produce alſo variations? M. Humboldt has made on this point a deciſive obſervation: the earthquake of the 4th of November 1799 changed ſenſibly the inclination of the needle. On the 1ſt of November it was 43° 65′; on the 7th it was only 42° 75′, and four months after it returned to 42° 85′, but it did not regain its former value; the intenſity of the magnetic force was not changed by the effect of this earthquake.

It is proved, then, by theſe obſervations, that local circumſtances may have on the inclination a ſenſible influence; and this influence is remarked in the countries traverſed by M. Humboldt.

It appears, therefore, that the mathematical hypotheſis which we have employed really expreſſes the law of nature, at leaſt to the north of the magnetic equator; for, though the firſt reſults obſerved towards the ſouth ſeem to bend to it alſo, the uncertainty under which we are, in regard to the true cauſe of theſe phenomena muſt ſtop our conjectures, and prevent us from extending too far the conſequences of the laws which we obſerve (F).

From the preceding reſults, we may calculate the points where the axis of the magnetic equator pierces the terreſtrial ſurface; for their latitudes are equal to the complements of the obliquity of that equator, and their meridian is at 100° of longitude from its nodes. The north magnetic pole is found alſo at 79° 1′ 4″ of north latitude, and at 30° 2′ 5″ of longitude weſt from Paris, which places it to the north of America. The other magnetic pole, ſymmetric to the preceding, is ſituated in the ſame latitude ſouth, and at 149° 67′ 55″ of longitude eaſt from Paris, which places it amidſt the eternal ice; indications entirely analogous to thoſe of Wilke and Lemounier.

If we could reach theſe poles, the compaſs would be ſeen vertical; but if any confidence can be placed in the law which we have diſcovered, this would be the only difference which would be obſerved in regard to the inclination, and we ſhould be ſtill as far diſtant as in Europe from the real centres which produce it. This reſult might appear to be of ſuch a nature as to diminiſh the intereſt one might have in viſiting theſe horrid regions, had we not alſo the hope of diſcovering there new phenomena in regard to the intenſity of the magnetic force, and the influence of meteors.

Theſe conſequences do not entirely accord with the opinion pretty generally received, and which aſcribes the increaſe of the magnetic force towards the north, to the great quantity of iron diſperſed in the polar regions; but it appears to us that this opinion is not agreeable to the truth. The cordillera of the Andes contains an enormous quantity of magnetic iron; the native iron of Chaco, that problematic maſs analogous to that of Pallas, and thoſe of Xacatecas in Mexico, is found even under the tropics.

On ſeeing the inclinations of the compaſs ſo exactly repreſented in the hypotheſis, they endeavoured to diſcover whether it could be applied to the intenſities obſerved by M. Humboldt; but they found that it did not apply. It gives indeed, an increaſe of the magnetic forces from the equator to the pole; but this increaſe, which at firſt is too ſlow, becomes afterwards too rapid. M. Biot has not yet been able to try whether the ſmall diſplacement of the terreſtrial magnet will contribute towards repreſenting them better; but it muſt be remarked, that the ſeries of the intenſities is extremely whimſical, and contains an infinite number of anomalies, ſo that local phenomena may have on this phenomenon a much more ſenſible influence than on the inclination.

On reviewing the reſults which have been given, it is ſeen that we have firſt determined the poſition of the magnetic equator by direct obſervations, which had never been done before; we have then proved that the magnetic force increaſes in proceeding from that equator to the poles; in the laſt place, we have given a mathematical hypotheſis, which, when reduced to a formula, ſatisfies all the inclinations hitherto obſerved.

Suppoſing, as has been done in this formula, the ſmall corrections of which it is ſuſceptible, its utility becomes evident, either for making known, in the courſe of time, the variations which may take place in the action of the terreſtrial magnetiſm, or to know it, or even foreſee the value of the inclination, which in a great many caſes is of the utmoſt importance.

For example, near the magnetic equator, the increaſe or diminution of the inclination will indicate to a veſſel on a voyage whether ſhe has gained or loſt in latitude by currents. This knowledge of the latitude is ſometimes as important as that of longitude. On the coaſts of Peru, for example, the currents tend from Chiloé to the north and north-eaſt with ſuch force, that one may go from Lima to Guayaquil in three or four days, and two, three, and ſometimes five months are neceſſary to return. It is conſequently of the greateſt importance for veſſels coming from Chili which ſtretch along the coaſt of Peru, to know their latitude. If they go beyond the port to which they are bound, they muſt work to the ſouthward, and every day's progreſs requires often a month of return. Unfortunately, the fogs which prevail during four or five months on the coaſt of Peru, prevent

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(F) Obſervations made at the Cape of Good Hope, Cape Horn, and New Holland, by different navigators, are very exactly repreſented by the above-mentioned formula; and it follows, that it extends alſo to the auſtral hemiſphere. We hope ſoon to have numerous and very exact obſervations on the inclination of the needle in that part of the earth. But we have thought it our duty to add to our table ſuch reſults as relate to it, and which we have been able to procure. We have inſerted alſo two obſervations on the intenſity, made with great care by M. Roſſel, during the expedition of d'Entrecaſteaux, which are very important, as they prove that the terreſtrial magnetic force increaſes alſo in the auſtral hemiſphere in proportion as one removes from the equator.

Theory.

prevent navigators from diſtinguiſhing the form of the coaſt; nothing is ſeen but the ſummits of the Andes, and that of the peaks which riſe above that ſtratum of vapours; but the figure of it is ſo uniform that pilots fall into miſtakes. They often remain 12 or 15 days without ſeeing the ſun or ſtars, and during that interval they come to anchor, being afraid of overſhooting their port; but if we ſuppoſe that the inclination of the magnetic needle in the ports to the ſouth of Lima is known, for example at Chancay, Huaura, and Santa, the dipping needle will ſhow whether it be, in regard to Lima, to the ſouth or to the north. It will ſhow at the ſame time oppoſite what point of the coaſt a veſſel is; and this indication will be attended with more exactneſs than one could hope for, becauſe in theſe ſeas the inclination varies with extraordinary rapidity. M. Humboldt, to whom we are indebted for theſe remarks, obſerved in theſe ſeas the following values.

Places.	*South Latitudes.*	*Inclinations.*
Huancey	10° 4′	6.80°
Huaura	11 3	9.00
Chancay	11 33	10.35

Theſe obſervations prove that the error of three or four degrees in the inclination in theſe ſeas would produce but a degree of error in latitude; and, on account of the tranquillity of the Pacific ocean, the inclination may be obſerved to within a degree nearly. Frequent inſtances of ſuch reſults may be ſeen in books of voyages. In like manner, if one knew exactly the inclination at the mouth of the Rio de la Plata, it would be very uſeful to navigators, who, when the Pamperos blow, remain 15 or 18 days without ſeeing the heavenly bodies, and go on different tacks for fear of loſing the parallel of the mouth of that river.

In a word, the inclination may indicate alſo the longitude in theſe ſeas; and this method may be employed when others fail. A veſſel which ſails there in the direction of a parallel could not find its longitude either by a chronometer or the declination of Halley, unleſs a ſtar could be ſeen, in order to take an horary angle or the magnetic azimuth. The dipping needle then throws light on the longitude amidſt the thickeſt fogs. We point out this method as one of thoſe which have only a local application; but hitherto little attention has been paid to it. Theſe ideas may be extended and rectified by able navigators.

In general, if the inclination of the needle, and the law we have tried to eſtabliſh, could be depended on, to obſerve the inclination and the terreſtrial latitude would alſo be ſufficient to determine the longitude; but we have not yet examined the extent of the errors of which this method may be ſuſceptible, and conſequently we confine ourſelves to a mere indication of it.

The phenomenon of the inclination has in maritime obſervations a peculiar and very remarkable advantage, namely, that of not being ſubject to thoſe great progreſſive variations which affect the declination. Without repeating what we have already ſaid above on the ſuppoſed conſtancy of this phenomenon, it may be remarked that our formula even affords a new proof that it may comprehend in the ſame law the obſervations made many years ago in Lapland, thoſe which Lacaille brought back in 1751 from the Cape of Good Hope, and thoſe which M. Humboldt has lately made in America.

Theory.

In ſhort, when we tried to repreſent the inclinations in different latitudes by the ſuppoſition of a magnet infinitely ſmall, very near the centre of the earth, and perpendicular to the magnetic equator, we did not pretend to conſider that hypotheſis as any thing real, but only as a mathematical abſtraction uſeful to connect the reſults, and proper to aſcertain in future whether any changes exiſt. In regard to the declination and intenſity, we freely confeſs that we are entirely unacquainted with their laws or their cauſes; and if any philoſopher is ſo fortunate as to bring them to one principle, which explains at the ſame time the variations of the inclination, it will no doubt be one of the greateſt diſcoveries ever made. But this reſearch, exceedingly difficult, requires, perhaps, before it be attempted, more obſervations, and in particular more preciſe obſervations, than have hitherto been collected. For this reaſon we have preſented the preceding reſearches, imperfect as they are, hoping our readers will receive them with indulgence *.

We would willingly have entered into a more full illuſtration of the theory of Æpinus, and compared it with the phenomena noticed in Chap. II. but the important paper juſt given has taken up ſo much room, that this article is already extended to very nearly the utmoſt limits aſſigned to it. We muſt therefore content ourſelves with giving ſome idea of the induction of magnetiſm by juxtapoſition according to Æpinus's hypotheſis, and muſt refer for the reſt to his *Tentamen Theoriæ Electricitatis et Magnetiſmi*, or to the abridgement of it in Van Swinden's work *Sur l'Analogie de l'Electricité et du Magnetiſme*, tom. ii.

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Induced magnetiſm by juxtapoſition explained.

Let NAS (fig. 31). be a magnet, of which the part next the north pole AN is overcharged, and let a bar of iron *s* B *n* be brought near the north pole of the magnet, ſo that their axes are in the ſame ſtraight line. Now, in this theory, the overcharged pole N acts on the iron only by its redundant fluid, for that part of the fluid which is merely ſufficient to ſaturate the iron will repel the fluid in B as much as the iron in AN attracts it, and of courſe can produce no change in B. In the ſame way SA acts on B merely by its redundant iron. Now, were the fluid in *s* B *n* immoveable, no ſenſible effect would be produced on it; but as it is ſuppoſed to be eaſily moveable, the redundant fluid in AN will have the effect of repelling it towards *n*, till the reſiſtance met with there, added to its own tendency to diffuſe itſelf uniformly, juſt balances the repulſion of AN. In the mean time, however, an attraction exiſts between the redundant iron in AS, and the fluid in B, by which the latter would be drawn from B *n*, and condenſed in B *s*, the attraction oppoſing the repulſion above mentioned; but ſince AS is more diſtant from every point of B than AN from the ſame point, the redundant fluid will prevail, and on the whole the fluid will be condenſed towards *n*, and rarefied towards *s*. The more diſtant we ſuppoſe the fluid and iron in the magnet to be, the more removed will be the centres of effort of its poles from their extremities, the ſmaller will be the action, and the difference of action of AN and AS, and of courſe the ſmaller the condenſation towards *n*, and the rarefaction towards *s*. Hence it is we learn,

* Phil. Mag. vol. xxii.

that, according as the poles of a magnet are more concentrated, the greater will be its power of action; and as this is agreeable to obſervation, it gives additional credit to the hypotheſis.

Now, we ſee that the piece of iron *n* B *s* is attracted in conſequence of its fluid being repelled towards its remote extremity, and diſtributed ſomething like the fluid in NAS. In this hypotheſis magnetiſm is ſuppoſed to depend entirely on the diffuſion of magnetic fluid. The iron B has become a magnet, and by having magnetiſm induced on it, is attracted by the magnet A. In a ſimilar way we might explain the action of the magnet, if its ſouth or deficient pole were preſented oppoſite to B.

103 Coulomb's theory.

When the notion of a magnetic fluid was once entertained, it is not ſurpriſing that philoſophers, reaſoning from the analogy between electricity and magnetiſm, and the different effects ariſing from the ſouth and north pole of a magnet, ſhould be led to the idea of the magnetic fluid being compounded of two fluids. Accordingly the hypotheſis of two magnetic fluids has long been a favourite on the continent, where it has been chiefly ſupported by Coulomb and Haüy. As the experiments and obſervations of the former philoſopher entitle him to the higheſt reſpect, we ſhall here give a ſketch of his theory of magnetiſm.

1. Coulomb admits of two magnetic fluids, one of which may be called the northern, and the other the ſouthern fluid.

2. The particles of each of theſe two fluids are mutually repulſive of each other; that is, the particles of the fluid N mutually repel each other, and the particles of the fluid S repel each other.

3. There is a mutual attraction between the particles of one of theſe fluids and the particles of the other; or the particles of the fluid N attract and are attracted by the particles of the fluid S.

4. In the ordinary ſtate of iron not magnetized, theſe two fluids are found mixed together, and hence a piece of ordinary iron under the uſual circumſtances exhibits no ſigns of magnetiſm.

5. In a magnetized body theſe two fluids are ſeparated, and this ſeparation takes place as ſoon as we begin to magnetize the body; one of the fluids N, retiring towards one extremity, and the other fluid S to the other extremity of the magnetized body.

6. The attraction and repulſion of two magnetic bodies, when they approach each other, is the reſult of the mutual action of the two fluids.

Suppoſe we have two needles A and B. If we make them approach each other on the ſide of the two poles of the ſame name, N or S, they will repel each other; but if they are made to approach on the ſide of different poles, as when the needle A preſents its north pole to the ſouth pole of the needle B, they will attract each other. Here there are four forces in action; 1. the fluid N of the needle A repels the fluid N of the needle B. 2. The ſame fluid N of the needle A attracts the fluid S of the needle B. 3. The fluid S of the needle A repels the fluid S of the needle B; and 4. The fluid S of the needle A attracts the fluid N of the needle B. Now, if the extremity N of the needle A be very near the extremity S of the needle B, the mutual attraction between the two fluids N and S, will be ſtronger than the mutual repulſion between the two fluids N, N, and the two fluids S, S, and conſequently the two needles will approach each other.

7. The attraction and repulſion of the two magnetic fluids is in the direct ratio of the maſſes, and in the inverſe ratio of the diſtances.

This important part of the theory Coulomb deduces from a ſeries of very delicate experiments made with his magnetic bars, ſimilar to thoſe by which he proved the ſame law to take place with reſpect to the action of the electric fluid. See ELECTRICITY, Part IV. chap. ii.

8. The magnetic fluid is entirely in the interior of magnetic bodies, for as the magnetic fluid moves with difficulty in the interior of a magnetic body, it cannot diffuſe itſelf over the ſurface, which is the reaſon why filings of iron brought near a magnetic bar, remain attached to it.

9. Conſequently magnetic bodies can have no magnetic atmoſphere.

10. In a magnetic needle, the centres of magnetic action are near the extremities of the needle.

11. A magnetic needle being broken in any place, each of its parts is found to have two poles.

12. The forces which attract a needle towards one pole, are equal to thoſe which draw it toward the other pole.

13. Magnetic bodies do not act on other bodies ſuſceptible of magnetiſm, in any other way than by attraction or repulſion; for the magnetic fluid remains entirely within the interior of theſe bodies.

14. Magnetic attraction ought to be regarded as a particular power, analogous, however, to the power which we call univerſal gravitation, the only difference being, that gravitation acts very ſenſibly on all bodies, whereas magnetiſm acts moſt powerfully on iron.

15. This magnetic power or attraction is therefore a particular power produced neither by impulſion, nor by the action of any other fluid.

104 Coulomb's mode of aſcertaining the magnetic dip.

Though the inſtrument which is uſually employed to meaſure the inclination of the magnetic needle is very ſimple in its conſtruction, it is nevertheleſs liable to great errors, which in general ariſe from the almoſt abſolute impoſſibility of placing the needle in all the poſitions it can take in equilibrium with regard to the effect of gravitation, that is to ſay, ſo that its centre of gravity may always exactly agree with the point on which it turns. When the dimenſions are conſiderable, a new inconvenience ariſes from a degree of flexure, which, though ſcarcely ſenſible, is nevertheleſs productive of very great effects from the ſlighteſt diſplacement of the centre of gravity producing a combination of the power of gravitation with that of magnetiſm.

To obviate theſe difficulties, Citizen Coulomb, inſtead of endeavouring to aſcertain immediately, as has been hitherto done, the direction of the magnetic needle in the vertical plane which paſſes through the magnetic pole, conceives the force of this pole to be decompoſed or reſolved into two others in the ſame plane, the one acting in a horizontal, and the other in a vertical direction. He determines ſeparately the intenſity of each of theſe laſt forces, and the reſult gives the direction in which the magnetic force acts, and which a needle governed ſingly by this force would take.

Theory.

Citizen Coulomb has proved, in the Memoirs of the Academy of Sciences for the year 1789, that the magnetic needle ſuſpended by its centre of gravity is inceſſantly brought back to its true direction by a conſtant force at the ſame place and time. It thence follows, that by obſerving the number of oſcillations made in a given time by a needle horizontally ſuſpended, the ratio of the horizontal component part of the magnetic power with gravity may be obtained. As to the vertical component part, it is meaſured by determining with care the weight neceſſary to be added to the ſouthern part of the magnetic needle, to maintain it in a perfectly horizontal poſition. That being done, if A and B repreſent the reſpective meaſures of the horizontal and vertical component parts of the magnetic power, $\frac{B}{A}$ will be the tangent of the angle made by their reſult with the horizontal force, and conſequently, it will be the inclination of the magnetic needle.

In the experiments made by Citizen Coulomb, the needle had the form of a right-angled parallelopipedon, very thin in proportion to its breadth, and always ſuſpended ſo that its breadth was kept in a vertical plane. Let P repreſent the weight of the needle, l the half of its length, λ the length of a pendulum that performs its oſcillations in the ſame time as the needle when it obeys the magnetic power in a horizontal plane. Coulomb then gives the formula $\frac{P\,l^2}{3\,\lambda}$ to calculate the momentum of the magnetic force referred to the arm of a lever of one millimeter in length. The length of the needle was 427 millimeters, its breadth 13, and its weight 88,753 milligrammes. It was ſuſpended horizontally by a thread of ſilk in a box well cloſed, and it made 30 oſcillations in 286 ſeconds, and by applying theſe data to the preceding formula, Coulomb found that the logarithm of the momentum of the horizontal magnetic force is 4.1740.

Coulomb having placed his needle in a clip, having knife edges, which reſted on two cylinders of glaſs, in the manner of the beam of a balance, endeavoured firſt to bring it to an equilibrium in a horizontal ſituation coinciding with the magnetic meridian, by placing the edges in a proper manner, and when they were ſufficiently near the point where the equilibrium took place, he completed it by the addition of ſmall weights. He then reverſed the poles of the needle by the magnetic touch, but without altering the poſition of the clip, and again bringing it to an equilibrium in this new ſtate, the ſum of the momenta of the additional weights placed in theſe two operations gave him the double of the momentum of the vertical component parts of the magnetic force, valued at $\frac{74467}{2}$. The reſult of this force, and of the horizontal force, is inclined 68° 9′.

In repeating theſe operations three times, Coulomb found ſucceſſively 68° 9′, 68° 13′, and 68° 11′. Though the differences of theſe reſults are very trifling, he thinks they are to be entirely attributed to errors in the obſervation; for he is aſſured they do not amount to ſo much. It is poſſible that the needle is ſubject to variations in the vertical ſimilar to thoſe which are known to take place in the horizontal plane.

Daniel Bernoulli contrived an ingenious dipping needle that may anſwer the purpoſe of an [illegible] inſtrument for making accurate obſervations [illegible]. It depends on the following principle. If a dipping needle be made by an ordinary workman, and balanced with ſome care, ſo that when impregnated with magnetiſm, it may ſhow nearly the true dip, and if it be touched, and the dip obſerved, then its magnetiſm deſtroyed, and its balance ſo altered, that without any magnetiſm it will take nearly the inclination of the true dip; and if it be then touched again, giving it the ſame polarity as it had before, it is evident that it will now approach very nearly to the true dip, ſince, by its want of perfect equilibrium it was deranged only a few degrees from its proper direction. If the ſecond obſervation of the dip ſhould, from the inaccurate formation of the needle, differ conſiderably from the firſt, the operation muſt be repeated; and in this third obſervation there will very ſeldom be an error of more than half a degree.

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Bernoulli's dipping needle.

Bernoulli's inſtrument is as follows. A very light graduated braſs circle EFG (fig. 32.) is fixed on one ſide of the dipping needle, ſo as to be concentric with its axis, and the whole is balanced with as much nicety as may be, before being impregnated. CD is a very light index fixed to the axis in ſuch a manner as to turn on it with ſome difficulty. By this the equilibrium of the needle will be deſtroyed. If great care has been taken in forming the inſtrument, and if it has been balanced with great accuracy, it will, by the addition of the index, be made to ſettle ſo as to have the index perpendicular to the horizon, at whatever degree of the circle the needle may happen to point. As ſuch accuracy, however, is ſcarcely to be expected, let the index be ſet to ſeveral different degrees of the circle, and note the inclination taken by the needle before being magnetized, correſponding to each poſition of the index, and let all theſe be written down. For example, let us ſuppoſe that when the index is at 50°, the needle inclines 46° from the horizon; if we obſerve at any place that the needle, after being magnetized, inclines 46°, when the index is at 50°, we may be ſure that the former is the true magnetic dip at that place, as the needle is not deranged by the magnetiſm that has been given it, from the ſituation it would aſſume by gravity alone. We uſually know ſomething of the dip that may be expected at any place. If we ſet the index accordingly, and if the needle does not then point out the expected dip, change the poſition of the index, and again obſerve the dip; examine whether this ſecond poſition of the index and the ſecond dip form a correſponding pair of numbers, ſuch as we have written down; if they do, we have got the true dip, but if not, another poſition of the index muſt be tried. Thus, by noticing whether the agreement of this laſt pair be greater or leſs than that of the former pair of numbers, we learn whether we are to change the poſition of the index in the ſame or in the oppoſite direction.

106
Analogy between electricity and magnetiſm.

A cloſe analogy has long been remarked between the phenomena of magnetiſm and thoſe of induced electricity, eſpecially thoſe of attraction and repulſion. The mechanical compoſition of theſe actions produces a directive power and polarity, both in electrical and magnetical bodies. It is eaſy to form an electrical needle that will arrange itſelf with reſpect to the overcharged and undercharged ends of a body electrified by [illegible], juſt as a magnetic needle is arranged, with reſpect to the magnet. A ſtick of ſealing wax may be touched in a manner ſimilar to the double touch, ſo as to acquire poles of conſiderable force, and very durable. Again, melted ſealing wax, when cooled in the neighbourhood of a poſitive and negative electric, acquires permanent poles, juſt as a red hot ſteel bar acquires them by being quenched near a magnet. Laſtly, lightning ſometimes gives polarity to needles, ſometimes deſtroys it, and ſometimes reverſes their polarity.

From theſe various circumſtances of reſemblance, ſome have ſuppoſed that both phenomena originate from the ſame cauſe, but there are ſeveral circumſtances which ſhow their original cauſes to be different. Thus, we find that electricity is common to all bodies, and can be excited or induced on all in a degree that is pretty nearly equal. Magnetiſm, on the contrary, though from Coulomb's experiments, it appears in ſome degree to affect all terreſtrial bodies, acts, however, very imperceptibly on all but iron and its compounds. The action of lightning muſt not be conſidered as a proof of their identity, ſince that is accompanied with a great degree of heat, and we have already ſeen that this power, under favourable circumſtances, is a very active agent, both in producing and deſtroying magnetiſm. Again, there is nothing in magnetiſm like a body being entirely overcharged, or entirely undercharged, as in electricity; but a magnetic body having two poles, muſt always be overcharged at one extremity, and undercharged at the other. There is nothing in magnetiſm reſembling that inconveivably rapid motion which we ſee in electricity. In fine, the only perfect reſemblance is between the induced magnetiſm of common iron, and the induced electricity of a conductor. On the arguments that have been employed for and againſt the identity of magnetiſm and electricity, our readers may conſult Van Swinden, *Sur l'Analogie de l'Electricité, et du Magnétiſme*, and a tract by Æpinus *De Similitudine Electricitatis et Magnetiſmi*.

Some late experiments of Ritter tend to ſhow a greater analogy than has yet been ſuppoſed, between magnetiſm and that modification of electricity which we call galvaniſm.

Ritter's experiment

Mr Ritter's firſt experiments with the magnet were on frogs. He found that a magnetic iron wire, with another not magnetic, excited a galvanic palpitation in theſe animals. Preſently he obſerved, that the ſouth pole excited ſtronger palpitations, and the north pole weaker, than the iron not magnetic. Having conſtantly noticed, that the metals moſt ſuſceptible of oxidation excited the ſtrongeſt palpitations, he inferred, that the ſouth pole poſſeſſes a greater affinity for oxygen than ſimple iron, and the north pole leſs.

This ſuppoſition he confirmed by means of ſeveral chemical re-agents. He placed a magnetic iron wire on pieces of glaſs in a plate of earthen ware, and poured upon it a very weak nitric acid. The ſouth pole was attacked by the acid much more powerfully than the north; and was ſoon ſurrounded by a depoſition of oxygen, the quantity of which greatly exceeded that of the other pole.

The different oxidability of the magnetic poles is very well exhibited likewiſe, by taking three ſmall bottles of equal ſize, filled with water, either pure or ſlightly acidulated, and putting into one the ſouth polar end of a magnetic wire, into a ſecond the north polar end of a ſimilar wire, and into the third the end of an equal wire not magnetic; the ſouth pole will firſt begin to depoſit oxide, the unmagnetic iron a little after, and the north pole laſt. This experiment requires conſiderable care. The ſurface of the water muſt be covered with very freſh oil of almonds, to exclude all acceſs of air. Care muſt be taken too, that one of the bottles is not more expoſed to the ſun than the others, becauſe light accelerates oxidation. Ritter convinced himſelf of this by direct experiments; expoſing two iron wires in water to the ſun, but covering one of the phials with black paper, when that in the phial left uncovered was oxidated much more quickly.

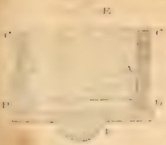
Theory.

If infuſion of litmus be ſubſtituted inſtead of the water in the three phials in the preceding experiment, the relative oxidations will be the ſame, but they will be attended with a change of colour, ſhowing that an acid is produced proportional to each oxidation; ſo that the ſouth pole not only undergoes the greateſt oxidation, but likewiſe reddens the infuſion of litmus moſt. The action that takes place in this experiment is very feeble, and frequently requires a week to produce a diſtinct effect; and indeed to accelerate it ſo much as this, it is neceſſary to add, previouſly to the infuſion, as much acetic acid as will incline it to red, without completely changing its colour. The infuſion reddened in this experiment reſumes its blue colour on expoſure to the air; but we muſt not hence conclude, that the acid produced by the action of the magnet is very volatile, for infuſion of litmus reddened by phoſphoric acid, or any other, exhibits the ſame phenomenon.

The following experiment exhibits ſome things peculiar, and therefore we ſhall give it more at large. It has not been repeated, but the harmony of its reſults is in favour of its accuracy. Sixteen magnetic wires, of equal ſize and power, were placed in ſix veſſels, all equally full of a mixture of one part nitric acid, and 36 parts water, in the following manner: in the firſt glaſs were placed two wires, one with the north pole immerſed in the fluid, the other with the ſouth, and not more than half a line aſunder: in the ſecond, the ſame, but the wires an inch and three-fourths apart: in the third and fourth were each three wires, with the ſouth poles of all immerſed, but their diſtances in the two glaſſes different, as in the firſt and ſecond: in the fifth and ſixth were wires ſimilarly arranged, but with the north poles immerſed. Different quantities of oxide were gradually depoſed, and to expreſs the whole in few words, we will call the ſouth pole S, the north pole N, their greater diſtance g, and their leſs p, and we will expreſs the order of oxidations as follows: $SNg > SNp > 3\,Sp > 3\,Sg > 3\,Np > 3\,Ng >$. On the nineteenth day it was obſerved, that the loſs of fluid by evaporation had not been equal in all the veſſels, but took place in the inverſe order of the oxidations. All the magnetic wires were weakened in power; NSg leaſt; NSp more: of the wires $3\,Sp$, two had loſt leſs power than the third; and in like manner $3\,Sg$, $3\,Np$ $3\,Ng$, had each two left more powerful than the third; the ſtrongeſt were equal to NSg.

In another experiment, where two little veſſels filled with infuſion of litmus were employed, one of them containing two magnetic wires, the ſouth poles of which were immerſed in the fluid; the other two ſimilar wires, of

Fig. 1



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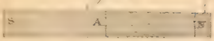

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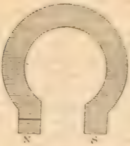

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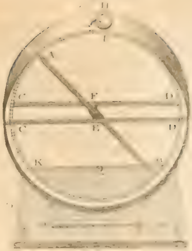
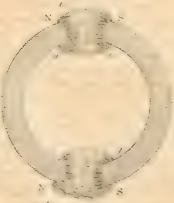
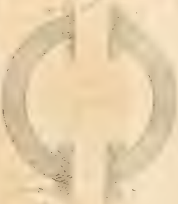


Fig. 6

Fig. 7.





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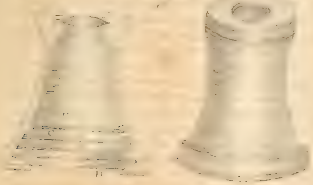

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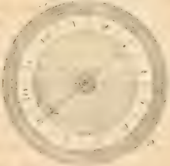

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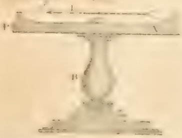
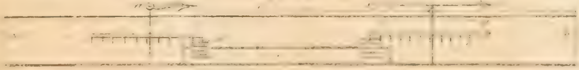


Fig. 13



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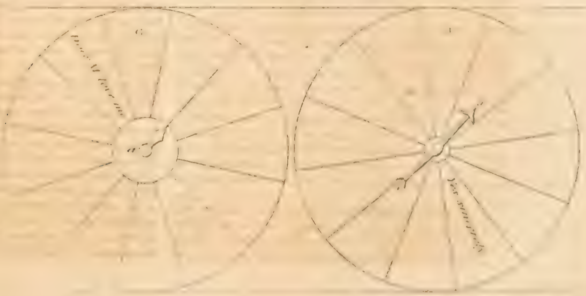

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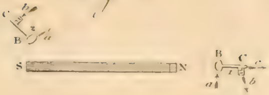

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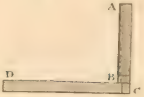

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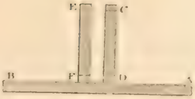

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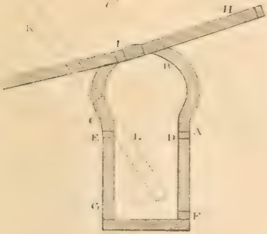

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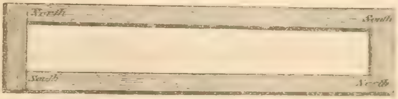

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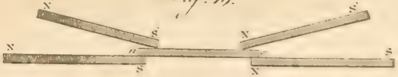

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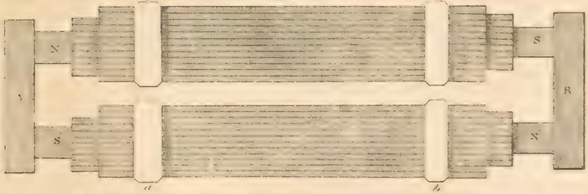

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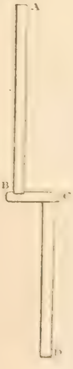

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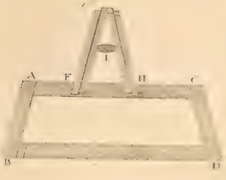

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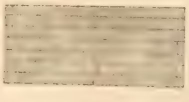

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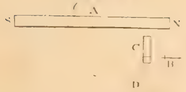
MAGNETISM

Fig. 24.



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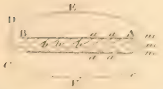

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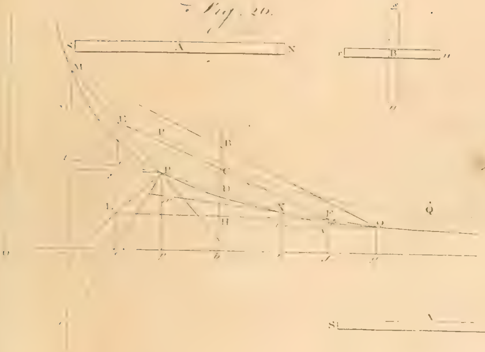

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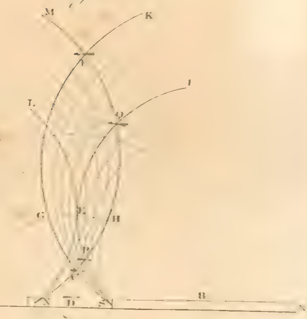

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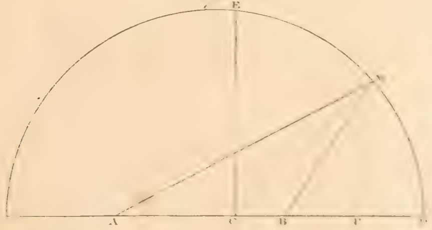

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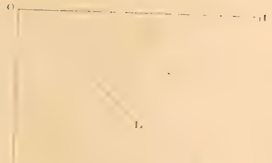

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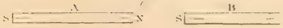

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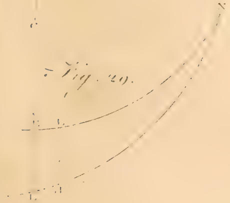

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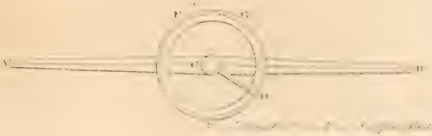

of which the oppoſite poles were immerſed; the oxidation was greateſt in the latter veſſel.

The analogy between galvaniſm and magnetiſm is ſtill farther proved by other experiments of Ritter on *galvanizing* metals, which he does by placing them in a ſtream of galvanic fluid proceeding from a ſtrong pile. He found that a golden needle thus galvanized and balanced on a pivot, exhibited, like a magnetized iron needle, both directive power and horizontal inclination.

Some late experiments of Ritter, referring ſtill more directly to the analogy between magnetiſm and galvaniſm, were communicated to the Royal Academy of Sciences of Munich, and the following are their general reſults.

1. Every magnet is equivalent to a pair of heterogeneous metals united together; its different poles repreſent as it were different metals.

2. Like them, it gives electricity; that is to ſay, one of the two poles, the poſitive electricity, and the other the negative.

3. By following the ſame proceſs, a certain number of magnets, as well as a certain number of pairs of metals, afforded electricity; and in this manner the electricities afforded by the poles of different magnets, have been ſucceſsfully indicated by the electrometer.

4. By means of theſe electricities, one of theſe batteries of magnets, accordingly as it is more or leſs ſtrong, produces upon dead and living bodies, all the phenomena which are produced by a pile of Volta, of the common kind, and of the ſame force.

5. The experiments which prove this, ſhow, that in magnetized iron, the ſouth pole gives poſitive electricity, and the north pole negative electricity; but that on the contrary in magnetized ſteel, the north pole affords the poſitive, and the ſouth pole the negative.

6. The ſame inverſe diſpoſition is alſo obſerved with regard to the polar oxidability of the magnetized body in which this change is produced by magnetiſm. In magnetized iron the ſouth pole is moſt oxidable, and the north pole leaſt; whereas in magnetized ſteel the north pole is moſt oxidable, and the ſouth leaſt.

7. Mr Ritter thinks, that by conſidering the earth as an immenſe magnet, theſe reſults might ſerve to explain various phenomena of nature, ſuch as the phyſical difference between the two hemiſpheres, the aurora borealis and aurora auſtralis. In fact, after what has been juſt ſtated, the earth conſidered as a magnet, may be taken as an equivalent to an immenſe pile of Volta, of which the poles are on one ſide ſufficiently cloſed by the waters of the ocean. And the action of this pile muſt produce, and has produced the greateſt chemical changes in the materials of the earth; changes which muſt have differed according to the poles; and of which pile the poles at the other extremity have always ſuch an abundance of electricity as to cauſe its ſplendour to appear by radiations in the vaſt ſpaces of the heavens*.

The foregoing experiments appear to prove that magnetiſm has ſome effect in producing chemical changes, and thence we may infer that perhaps it would not be altogether inactive in the animal economy.

Nicholſon's Journal, N°. 7.

ERRATUM.—Page 376, column 2d. line 19. in ſome copies, *for* without its being neceſſary to obſerve that, *read* without its being neceſſary to rub them with the upper pair. When magnets of greater force are deſired.

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Animal Magnetiſm.

Animal MAGNETISM, a ſympathy ſuppoſed by ſome perſons to exiſt between the magnet and the human body; by means of which the former, it was thought, poſſeſſed the property of curing many diſeaſes.

The notion of animal magnetiſm appears to have originated, in 1774, with a German philoſopher named *Father Hehl*, who greatly recommended the uſe of the magnet in medicine. M. Meſmer, a phyſician of the ſame country, by adopting the principles of Hehl, became the direct founder of the ſyſtem; but, afterwards deviating from the tenets of his inſtructor, he loſt his patronage, as well as that of Dr Ingenhouſz, which he had formerly enjoyed. Meſmer had already diſtinguiſhed himſelf by " A diſſertation on the influence of the Stars upon the human body," which he publicly defended in a theſis before the univerſity of Vienna; but he

Animal Magnetiſm

he was ſo unable to ſtand before the oppoſition of Hehl and Ingenhouſz, that his ſyſtem fell almoſt inſtantly into diſrepute. Meſmer appealed to the Academy of Sciences at Berlin; but they rejected his principles as deſtitute of foundation, and unworthy of the ſmalleſt attention. He then made a tour through Germany, publiſhing everywhere the great cures he performed by means of his animal magnetiſm, while his enemies everywhere purſued him with detections of the falſehood of his aſſertions.

Meſmer, ſtill undaunted by ſo many defeats, returned to Vienna; but meeting there with no better ſucceſs than before, he retired to Paris in the beginning of the year 1778. Here he met with a very different reception. He was firſt patronized by the author of the *Dictionnaire des Merveilles de la Nature*; in which work a great number of his cures were publiſhed, Meſmer himſelf receiving likewiſe an ample teſtimony of his candour and *ſolid reaſoning*. Our phyſician ſoon collected ſome patients; and in the month of April 1778 retired with them to Creteil, from whence he in a ſhort time returned with them perfectly cured. His ſucceſs was now as great as his former diſappointment. Patients increaſed ſo rapidly that the doctor was ſoon obliged to take in pupils to aſſiſt him in his operations. Theſe pupils ſucceeded equally well as Meſmer himſelf; and ſo well did they take care of their own emolument, that one of them named M. Deſlon realized upwards of 100,000l. ſterling. In 1779 Meſmer publiſhed a memoir on the ſubject of Animal Magnetiſm, promiſing afterwards a complete work upon the ſame, which ſhould make as great a revolution in philoſophy as it had already done in medicine.

The new ſyſtem now gained ground daily; and ſoon became ſo faſhionable, that the jealouſy of the faculty was rouſed, and an application concerning it was made to government. In conſequence of this a committee was appointed to inquire into the matter, conſiſting partly of phyſicians and partly of members of the Royal Academy of Sciences, with Dr Benjamin Franklin at their head. This was a thunderſtroke to the ſupporters of the new doctrine.——Meſmer himſelf refuſed to have any communication with the committee; but his moſt celebrated pupil Deſlon was leſs ſcrupulous, and explained the principles of his art in the following manner:

1. Animal magnetiſm is an univerſal fluid, conſtituting an abſolute plenum in nature, and the medium of all mutual influence between the celeſtial bodies, and betwixt the earth and animal bodies.

2. It is the moſt ſubtle fluid in nature; capable of a flux and reflux, and of receiving, propagating, and continuing all kinds of motion.

3. The animal body is ſubjected to the influences of this fluid by means of the nerves, which are immediately affected by it.

4. The human body has poles and other properties analogous to the magnet.

5. The action and virtue of animal magnetiſm may be communicated from one body to another, whether animate or inanimate.

6. It operates at a great diſtance without the intervention of any body.

7. It is increaſed and reflected by mirrors; communicated, propagated, and increaſed by ſound; and may be accumulated, concentrated, and tranſported.

8. Notwithſtanding the univerſality of this fluid, all animal bodies are not equally affected by it; on the other hand, there are ſome, though but few in number, the preſence of which deſtroys all the effects of animal magnetiſm.

9. By means of this fluid nervous diſorders are cured immediately, and others mediately; and its virtues, in ſhort, extend to the univerſal cure and preſervation of mankind.

From this extraordinary theory, Meſmer or M. Deſlon, had fabricated a paper, in which he ſtated that there was in nature but one diſeaſe and one cure, and that this cure was animal magnetiſm: and laſtly, M. Deſlon engaged, 1. To prove to the commiſſioners, that ſuch a thing as animal magnetiſm exiſted; 2. To prove the utility of it in the cure of diſeaſes; after which he was to communicate to them all that he knew upon the ſubject. The commiſſioners accordingly attended in the room where the patients underwent the magnetical operations. The apparatus conſiſted of a circular platform made of oak, and raiſed about a foot and a half from the ground; which platform was called the *baquet*. At the top of it were a number of holes, in which were iron rods with moveable joints for the purpoſe of applying them to any part of the body. The patients were placed in a circle round, each touching an iron rod, which he could apply to any part of the body at pleaſure; they were joined to one another by a cord paſſing round their bodies, the deſign being to increaſe the effect by communication. In the corner of the room was a piano forte, on which ſome airs were played, occaſionally accompanied with a ſong. Each of the patients held in his hand an iron rod ten or twelve feet long; the intention of which, as Deſlon told the commiſſioners, was to concentrate the magnetiſm in its point, and thus to render its effects more ſenſible. Sound is another conductor of this magnetiſm; and in order to communicate the magnetiſm to the piano forte, nothing more is neceſſary than to bring the iron rod near it. Some magnetiſm is alſo furniſhed by the perſon who plays it; and this magnetiſm is tranſmitted to the patients by the ſounds. The internal part of the platform was ſaid to be ſo contrived as to concentrate the magnetiſm, and was the reſervoir whence the virtue diffuſed itſelf among the patients. Its ſtructure, however, is not mentioned; but the committee ſatisfied themſelves, by means of a needle and electrometer, that neither common magnetiſm nor electricity was concerned.

Beſides the different ways of receiving the magnetiſm already mentioned, viz. by the iron, cord, and piano forte, the patients alſo had it directly from the doctor's finger, and a rod which he held in his hand, and which he carried about the face, head, or ſuch parts of the patient as were diſeaſed; obſerving always the direction of what he called the poles. The principal application of magnetiſm, however, was by preſſure of the hands or fingers on the hypochondria or lower regions of the ſtomach.

The effects of theſe operations upon Deſlon's patients were very different. Some felt nothing, neither had the magnetiſm any effect whatever upon them.

Some ſpit, coughed, ſweat, and felt, or pretended to feel, extraordinary heats in different parts of the body. Many women, but very few men, had convulſions, which Deſlon called their criſis, &c.—The commiſſioners at laſt found that they could come to no ſatisfactory concluſion while they attended in this public way, and therefore determined to try the experiments themſelves privately. As the fluid itſelf, however, was totally imperceptible by any of the ſenſes, they could only aſcertain themſelves of its exiſtence by ultimately curing diſeaſes, or by its obſervable effects upon the human body. Being well aſſured, however, that though many diſeaſes were cured, it would not amount to any proof of the exiſtence of animal magnetiſm, they determined to obſerve its effects on the animal economy. For this purpoſe they made the following experiments:

1. They tried it upon themſelves, and felt nothing.

2. Seven of Deſlon's patients were magnetized at Dr Franklin's houſe, four of whom felt nothing; three felt, or affected to feel, ſomething.

3. Several perſons in a higher ſphere of life were magnetized, and felt nothing.

4. The commiſſioners, now determined to diſcover what ſhare imagination had in this buſineſs, blindfolded ſeveral of the common people, and made them ſometimes think that they were magnetized, at other times they magnetized them without letting them know that they did ſo: the conſequence was, that when they ſuppoſed themſelves magnetized, the patients likewiſe thought they felt ſomething, and *vice verſa*.

5. A magnetized tree was ſaid to produce convulſions; a young man, blindfolded, fell into convulſions when he imagined himſelf near the tree, though he was really at a conſiderable diſtance from it. Deſlon accounted for this on the principle of all trees being magnetic: but in this caſe, every one, ſuſceptible of magnetiſm, would be ſeized with convulſions when he approached a tree. The ſame influence of imagination was obſerved in a woman accuſtomed to have convulſions when magnetized. They came on when nothing was done to her, on being told, when blinded, that ſhe was magnetized.

Other inſtances are given, from which it was evident, either that the patients were impoſtors, or in ſuch a moſt wretched ſtate of debility both of mind and body, that the moſt trifling effects of the former had the moſt powerful effects on the latter. The commiſſioners therefore entirely diſapproved of the whole. The touch, imitation, and imagination, they concluded, were the great cauſes of the effects produced by M. Deſlon's operations; and by means of theſe they ſuppoſed, that convulſions, which in themſelves are a very violent diſorder, might be ſpread much farther than could be wiſhed, even through a whole city. It was obſerved that the operator ſometimes preſſed ſtrongly, and for a length of time, upon different parts of the body, particularly the hypochondria and pit of the ſtomach; and it is well known that a ſtrong preſſure on theſe parts will produce diſagreeable ſenſations in thoſe who enjoy perfect health.

It is needleſs to add more upon this ſubject, than that Meſmer complained of the report of the commiſſioners, petitioned parliament, was by them commanded to diſcover the myſteries of his doctrine; and that it is now exploded by every man of ſenſe.—The concluſion of the academicians concerning it was, that it is not entirely uſeleſs even to philoſophy; as it is one *fact* more to be conſigned to the hiſtory of the errors and illuſions of the human mind, and a ſignal inſtance of the power of imagination.

MAGNIFYING, the making of objects appear larger than they would otherwiſe do; whence convex lenſes, which have the power of doing this, are called *magnifying glaſſes*. See OPTICS.

MAGNITUDE, whatever is made up of parts locally extended, or that has ſeveral dimenſions; as a line, ſurface, ſolid, &c.

MAGNOLIA, the LAUREL-LEAVED TULIP TREE, a genus of plants belonging to the polyandria claſs; and in the natural method ranking under the 52d order, *Coadnatæ*. See BOTANY *Index*.

MAGNUS CAMPUS, in *Ancient Geography*, a tract lying towards Scythopolis, or Bethſan in Galilee, beyond which it extends into Samaria; Joſephus placing the common boundary between theſe two diſtricts in the Campus Magnus. Called alſo *Eſdrelon*, (Judith); 30 miles long, and 18 broad; having Samaria with Mount Ephraim to the ſouth, the lake Geneſareth to the eaſt, Mount Carmel to the weſt, and Lebanon to the north.

MAGNUS *Portus*, in *Ancient Geography*, a port of the Belgæ, in Britain, on the Channel. Now thought to be Portſmouth in Hampſhire.—Another *Portus Magnus* of Bætica in Spain; a port to the eaſt of Abdera.

MAGO, the name of ſeveral Carthaginian generals. See CARTHAGE.

MAGO, in *Ancient Geography*, a citadel and town of the Balearis Minor, or Minorca. Now Maon, or Mahon. E. Long. 4. 6. N. Lat. 39. 5.

MAGONTIACUM, MOGONTIACUM, or *Mogontiacus*, truncated afterwards by the poets to Mogontia, Maguntia, and Moguntia: a town of Gallia Belgica. Now *Mentz*, capital of the electorate of that name; ſituated at the confluence of the Rhine and Maine. E. Long. 8° N. Lat. 50°.

MAGOPHONIA (formed from μαγος, "magus," and φονος, "ſlaughter"), the name of a feaſt among the ancient Perſians, held in memory of the expulſion of the Magians. The Magian Smerdis having uſurped the throne of Perſia, upon the death of Cambyſes, 521 years before Jeſus Chriſt, ſeven of the principal lords of the court conſpired to drive him out of it.—Their deſign was executed with good ſucceſs. Smerdis and his brother, another Magian, called Patizithes, were killed. Upon which the people alſo roſe, and put all the Magi to the ſword, inſomuch that there would not one have eſcaped, had not night come upon them. Darius, ſon of Hyſtaſpes, was then elected king; and, in memory of this maſſacre of the Magi, a feaſt was inſtituted, ſays Herodotus, called *Magophonia*. See MAGI.

MAGPIE. See CORVUS, ORNITHOLOGY *Index*.

MAHIE, the name given by the inhabitants of Otaheite, or George's iſland, to their bread-fruit when made into a kind of ſour paſte, which, in conſequence of having undergone a fermentation, will keep a conſiderable time, and ſupply them with food when no ripe fruit is to be had. When therefore they ſee a great ſhow of new fruit on the trees, they ſtrip them all at once of their former crop, of which they make mahie. This *ſuccedaneum* for ripe bread-fruit is thus made. They gather the fruit before it be perfectly ripe, and laying it in heaps, cover it cloſely with leaves. In this ſtate it ferments, and becomes diſagreeably ſweet; the core is then taken out entire, and the reſt of the fruit thrown into a hole in their houſes, dug on purpoſe, and neatly lined in the bottom and ſides with graſs. The whole is then covered with leaves, and heavy ſtones are laid upon it. In this ſtate it undergoes a ſecond fermentation, and becomes ſour; after which it will ſuffer no change for many months. It is taken out of this hole as it is wanted for uſe, and being made into balls, it is wrapped up in leaves and baked, and thus dreſſed it will keep for five or ſix weeks. It is eaten, both cold and hot, and the natives of thoſe countries ſeldom make a meal without it; but to Captain Cook and his company the taſte was as diſagreeable as that of a pickled olive generally is the firſt time it is eaten.

MAHO. See Hibiscus, Botany *Index*.

MAHOGANY. See Swietenia, Botany *Index*.

MAHOMET, or Mohammed, ſtyled the *Impoſtor*, was born in the reign of Anuſhirwan the Juſt, emperor of Perſia, about the end of the 6th century of the Chriſtian era. He came into the world under ſome diſadvantages. His father Abd'allah was a younger ſon of Abd'almotalleb; and dying very young, and in his father's lifetime, left his widow and infant ſon in very mean circumſtances, his whole ſubſtance conſiſting but of five camels and one Ethiopian ſhe-ſlave. Abd'almotalleb was therefore obliged to take care of his grandchild Mahomet; which he not only did during his life, but at his death enjoined his eldeſt ſon Abu Taleb, who was brother to Abd'allah by the ſame mother to provide for him for the future; which he very affectionately did, and inſtructed him in the buſineſs of a merchant, which he followed; and to that end he took him into Syria when he was but 13. He afterwards recommended him to Khadijah, a noble and rich widow, for her factor; in whoſe ſervice he behaved himſelf ſo well, that by making him her huſband ſhe ſoon raiſed him to an equality with the richeſt in Mecca.

After he began by this advantageous match to live at his eaſe, it was, that he formed the ſcheme of eſtabliſhing a new religion, or, as he expreſſed it, of replanting the only true and ancient one profeſſed by Adam, Noah, Abraham, Moſes, Jeſus, and all the prophets, by deſtroying the groſs idolatry into which the generality of his countrymen had fallen, and weeding out the corruptions and ſuperſtitions which the latter Jews and Chriſtians had, as he thought, introduced into their religion, and reducing it to its original purity, which conſiſted chiefly in the worſhip of one only God.

Before he made any attempt abroad, he rightly judged that it was neceſſary for him to begin with the converſion of his own houſehold. Having therefore retired with his family, as he had done ſeveral times before, to a cave in Mount Hara, he there opened the ſecret of his miſſion to his wife Khadijah; and acquainted her, that the angel Gabriel had juſt before appeared to him, and told him that he was appointed the apoſtle of God: he alſo repeated to her a paſſage which he pretended had been revealed to him by the miniſtry of the angel, with thoſe other circumſtances of this firſt appearance, which are related by the Mahometan writers. Khadijah received the news with great joy; ſwearing by him in whoſe hands her ſoul was, that ſhe truſted he would be the prophet of his nation; and immediately communicated what ſhe had heard to her couſin Warakah Ebn Nawfal, who, being a Chriſtian, could write in the Hebrew character, and was tolerably well verſed in the ſcriptures; and he as readily came into her opinion, aſſuring her that the ſame angel who had formerly appeared unto Moſes was now ſent to Mahomet. The firſt overture the prophet made was in the month of Ramadan, in the 40th year of his age, which is therefore uſually called the year of his miſſion.

Encouraged by ſo good a beginning, he reſolved to proceed, and try for ſome time what he could do by private perſuaſion, not daring to hazard the whole affair by expoſing it too ſuddenly to the public. He ſoon made proſelytes of thoſe under his own roof, viz. his wife Khadijah, his ſervant Zeid Ebn Haretha, to whom he gave his freedom on that occaſion, (which afterwards became a rule to his followers), and his couſin and pupil Ali, the ſon of Abu Taleb, though then very young: but this laſt, making no account of the other two, uſed to ſtyle himſelf the *firſt of believers*. The next perſon Mahomet applied to was Abd'allah Ebn Abi Kohafa, ſurnamed *Abu Becr*, a man of great authority among the Koreiſh, and one whoſe intereſt he well knew would be of great ſervice to him; as it ſoon appeared: for Abu Becr, being gained over, prevailed alſo on Othman Ebn Affan, Abd'alraham Ebn Awf, Saad Ebn Abbi Wakkas, Al Zobeir Ebn al Awam, and Telha Ebn Obeid'allah, all principal men of Mecca, to follow his example. Theſe men were the ſix chief companions, who, with a few more, were converted in the ſpace of three years: at the end of which, Mahomet having, as he hoped, a ſufficient intereſt to ſupport him, made his miſſion no longer a ſecret, but gave out that God had commanded him to admoniſh his near relations; and in order to do it with more convenience and proſpect of ſucceſs, he directed Ali to prepare an entertainment, and invite the ſons and deſcendants of Abd'almotalleb, intending then to open his mind to them. This was done, and about 40 of them came; but Abu Laheb, one of his uncles, making the company break up before Mahomet had an opportunity of ſpeaking, obliged him to give them a ſecond invitation the next day; and when they were come he made them the following ſpeech: "I know no man in all Arabia who can offer his kindred a more excellent thing than I now do you; I offer you happineſs both in this life, and in that which is to come; God Almighty hath commanded me to call you unto him: Who, therefore, among you will be aſſiſtant to me herein, and become my brother and my vicegerent?" All of them heſitating, and declining the matter, Ali at length roſe up, and declared that he would be his aſſiſtant; and vehemently threatened thoſe who ſhould oppoſe him. Mahomet upon this embraced Ali with great demonſtrations of affection, and deſired all who

Mahomet. were preſent to hearken to and obey him as his deputy; at which the company broke out into a great laughter, telling Abu Taleb that he muſt now pay obedience to his ſon.

This repulſe, however, was ſo far from diſcouraging Mahomet, that he began to preach in public to the people; who heard him with ſome patience, till he came to upbraid them with the idolatry, obſtinacy, and perverſeneſs of themſelves and their fathers: which ſo highly provoked them, that they declared themſelves his enemies; and would ſoon have procured his ruin, had he not been protected by Abu Taleb. The chief of the Koreiſh warmly ſolicited this perſon to deſert his nephew, making frequent remonſtrances againſt the innovations he was attempting; which proving ineffectual, they at length threatened him with an open rupture, if he did not prevail on Mahomet to deſiſt. At this Abu Taleb was ſo far moved, that he earneſtly diſſuaded his nephew from puſhing the affair any farther, repreſenting the great danger he and his friends muſt otherwiſe run. But Mahomet was not to be intimidated; telling his uncle plainly, *that if they ſet the ſun againſt him on his right hand, and the moon on his left, he would not leave his enterpriſe*: And Abu Taleb, ſeeing him ſo firmly reſolved to proceed, uſed no further arguments, but promiſed to ſtand by him againſt all his enemies.

The Koreiſh, finding they could prevail neither by fair words or menaces, tried what they could do by force and ill treatment; uſing Mahomet's followers ſo very injuriouſly, that it was not ſafe for them to continue at Mecca any longer: whereupon Mahomet gave leave to ſuch of them as had not friends to protect them to ſeek for refuge elſewhere. And accordingly in the fifth year of the prophet's miſſion, 16 of them, four of whom were women, fled into Ethiopia; and among them Othman Ebn Affan and his wife Rakiah, Mahomet's daughter. This was the firſt flight; but afterwards ſeveral others followed them, retiring one after another, to the number of 83 men and 18 women, beſides children. Theſe refugees were kindly received by the Najaſhi, or king of Ethiopia; who refuſed to deliver them up to thoſe whom the Koreiſh ſent to demand them, and, as the Arab writers unanimouſly atteſt, even profeſſed the Mahometan religion.

In the ſixth year of his miſſion, Mahomet had the pleaſure of ſeeing his party ſtrengthened by the converſion of his uncle Hamza, a man of great valour and merit; and of Omar Ebn al Kattab, a perſon highly eſteemed, and once a violent oppoſer of the prophet. As perſecution generally advances rather than obſtructs the ſpreading of a religion, Iſlamiſm made ſo great a progreſs among the Arab tribes, that the Koreiſh, to ſuppreſs it effectually if poſſible, in the ſeventh year of Mahomet's miſſion, made a ſolemn league or covenant againſt the Haſhemites and the family of Abd'almotalleb, engaging themſelves to contract no marriages with any of them, and to have no communication with them; and, to give it the greater ſanction, reduced it into writing, and laid it up in the caaba. Upon this the tribe became divided into two factions; and the family of Haſhem all repaired to Abu Taleb, as their head: except only Abd'al Uzza, ſurnamed *Abu Laheb*, who, out of inveterate hatred to his nephew and his doctrine, went over to the oppoſite party, whoſe chief was Abu Soſian Ebn Harb, of the family of Ommeya. Mahomet.

The families continued thus at variance for three years; but in the tenth year of his miſſion, Mahomet told his uncle Abu Taleb, that God had manifeſtly ſhowed his diſapprobation of the league which the Koreiſh had made againſt them, by ſending a worm to eat out every word of the inſtrument except the name of *God*. Of this accident Mahomet had probably ſome private notice: for Abu Taleb went immediately to the Koreiſh, and acquainted them with it; offering, if it proved falſe, to deliver his nephew up to them; but in caſe it were true, he inſiſted that they ought to lay aſide their animoſity, and annul the league they had made againſt the Haſhemites. To this they acquieſced; and going to inſpect the writing, to their great aſtoniſhment found it to be as Abu Taleb had told; and the league was thereupon declared void.

In the ſame year Abu Taleb died, at the age of above fourſcore, and it is the general opinion that he died an infidel: though others ſay, that when he was at the point of death he embraced Mahometiſm; and produce ſome paſſages out of his poetical compoſitions to confirm their aſſertion. About a month, or, as ſome write, three days after the death of this great benefactor and patron, Mahomet had the additional mortification to loſe his wife Khadijah, who had ſo generouſly made his fortune. For which reaſon this year is called the *year of mourning*.

On the death of theſe two perſons, the Koreiſh began to be more troubleſome than ever to their prophet, and eſpecially ſome who had formerly been his intimate friends; inſomuch that he found himſelf obliged to ſeek for ſhelter elſewhere, and firſt pitched upon Tayef, about 60 miles eaſt from Mecca, for the place of his retreat. Thither therefore he went, accompanied by his ſervant Zeid, and applied himſelf to two of the chief of the tribe of Thakif who were the inhabitants of that place; but they received him very coldly. However, he ſtaid there a month; and ſome of the more conſiderate and better ſort of men treated him with a little reſpect: but the ſlaves and inferior people at length roſe againſt him; and bringing him to the wall of the city, obliged him to depart and return to Mecca, where he put himſelf under the protection of Al Motaam Ebn Adi.

This repulſe greatly diſcouraged his followers. However, Mahomet was not wanting to himſelf; but boldly continued to preach to the public aſſemblies at the pilgrimage, and gained ſeveral proſelytes; and among them ſix of the inhabitants of Yathreb of the Jewiſh tribe of Khazraj; who, on their return home, failed not to ſpeak much in commendation of their new religion, and exhorted their fellow citizens to embrace the ſame.

In the 12th year of his miſſion it was that Mahomet gave out that he had made his night-journey from Mecca to Jeruſalem, and thence to heaven, ſo much ſpoken of by all that write of him. Dr Prideaux thinks he invented it, either to anſwer the expectations of thoſe who demanded ſome miracle as a proof of his miſſion; or elſe, by pretending to have converſed with God, to eſtabliſh the authority of whatever he ſhould think fit to leave behind by way of oral tradition, and

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Mahomet. make his ſayings to ſerve the ſame purpoſe as the oral law of the Jews. But it does not appear that Mahomet himſelf ever expected ſo great a regard ſhould be paid to his ſayings, as his followers have ſince done; and ſeeing he all along diſclaimed any power of performing miracles, it ſeems rather to have been a fetch of policy to raiſe his reputation, by pretending to have actually converſed with God in heaven, as Moſes had heretofore done in the Mount, and to have received ſeveral inſtitutions immediately from him, whereas before he contented himſelf with perſuading them that he had all by the miniſtry of Gabriel.

However, this ſtory ſeemed ſo abſurd and incredible, that ſeveral of his followers left him upon it; and had probably ruined the whole deſign, had not Abu Becr vouched for his veracity, and declared, that, if Mahomet affirmed it to be true, he verily believed the whole. Which happy incident not only retrieved the prophet's credit, but increaſed it to ſuch a degree, that he was ſecure of being able to make his diſciples ſwallow whatever he pleaſed to impoſe on them for the future. And this fiction, notwithſtanding its extravagance, was one of the moſt artful contrivances Mahomet ever put in practice, and what chiefly contributed to the raiſing of his reputation to that great height to which it afterwards arrived.

In this year, called by the Mahometans the *accepted year*, 12 men of Yathreb or Medina, of whom 10 were of the tribe of Khazraj, and the other two of that of Aws, came to Mecca, and took an oath of fidelity to Mahomet at Al Akaba, a hill on the north of that city. This oath was called the *woman's oath*; not that any women were preſent at this time, but becauſe a man was not thereby obliged to take up arms in defence of Mahomet or his religion; it being the ſame oath that was afterwards exacted of the women, the form of which we have in the Koran, and is to this effect: viz. That they ſhould renounce all idolatry; that they ſhould not ſteal, nor commit fornication, nor kill their children (as the Pagan Arabs uſed to do when they apprehended they ſhould not be able to maintain them), nor forge calumnies; and that they ſhould obey the prophet in all things that were reaſonable. When they had ſolemnly engaged to all this, Mahomet ſent one of his diſciples, named *Maſab Ebn Omair*, home with them, to inſtruct them more fully in the grounds and ceremonies of his new religion.

Maſab being arrived at Medina, by the aſſiſtance of thoſe who had been formerly converted, gained ſeveral proſelytes, particularly Oſaid Ebn Hodeira, a chief man of the city, and Saad Ebn Moadh, prince of the tribe of Aws; Mahometaniſm ſpreading ſo faſt, that there was ſcarce a houſe wherein there were not ſome who had embraced it.

The next year, being the 13th of Mahomet's miſſion, Maſab returned to Mecca, accompanied by 73 men and two women of Medina who had profeſſed Iſlamiſm, beſides ſome others who were as yet unbelievers. On their arrival, they immediately ſent to Mahomet, and offered him their aſſiſtance, of which he was now in great need; for his adverſaries were by this time grown ſo powerful in Mecca, that he could not ſtay there much longer without imminent danger. Wherefore he accepted their propoſal, and met them one night, by appointment, at Al Akaba above mentioned, attended by his uncle Al Abbas; who, though he was Mahomet. not then a believer, wiſhed his nephew well, and made a ſpeech to thoſe of Medina, wherein he told them, that as Mahomet was obliged to quit his native city, and ſeek an aſylum elſewhere, and they had offered him their protection, they would do well not to deceive him; that if they were not firmly reſolved to defend, and not betray him, they had better declare their minds, and let him provide for his ſafety in ſome other manner. Upon their proteſting their ſincerity, Mahomet ſwore to be faithful to them, on condition that they ſhould protect him againſt all inſults as heartily as they would their own wives and families. They then aſked him what recompenſe they were to expect if they ſhould happen to be killed in his quarrel; he anſwered, Paradiſe. Whereupon they pledged their faith to him, and ſo returned home; after Mahomet had choſen 12 out of their number, who were to have the ſame authority among them as the 12 apoſtles of Chriſt had among his diſciples.

Hitherto Mahomet had propagated his religion by fair means; ſo that the whole ſucceſs of his enterpriſe, before his flight to Medina, muſt be attributed to perſuaſion only, and not to compulſion. For before this ſecond oath of fealty or inauguration at Al Akaba, he had no permiſſion to uſe any force at all; and in ſeveral places of the Koran, which he pretended were revealed during his ſtay at Mecca, he declares his buſineſs was only to preach and admoniſh; that he had no authority to compel any perſon to embrace his religion; and that, whether people believe or not, was none of his concern, but belonged ſolely unto God. And he was ſo far from allowing his followers to uſe force, that he exhorted them to bear patiently thoſe injuries which were offered them on account of their faith; and, when perſecuted himſelf, choſe rather to quit the place of his birth and retire to Medina, than to make any reſiſtance. But this great paſſiveneſs and moderation ſeem entirely owing to his want of power, and the great ſuperiority of his oppoſers for the firſt 12 years of his miſſion; for no ſooner was he enabled, by the aſſiſtance of thoſe of Medina, to make head againſt his enemies, than he gave out, that God had allowed him and his followers to defend themſelves againſt the infidels; and at length, as his forces increaſed, he pretended to have the divine leave even to attack them, and to deſtroy idolatry, and ſet up the true faith by the ſword; finding, by experience, that his deſigns would otherwiſe proceed very ſlowly, if they were not utterly overthrown; and, knowing, on the other hand, that innovators, when they depend ſolely on their own ſtrength, and can compel, ſeldom run any riſk; from whence, ſays Machiavel, it follows, that all the armed prophets have ſucceeded, and the unarmed ones have failed. Moſes, Cyrus, Theſeus, and Romulus, would not have been able to eſtabliſh the obſervance of their inſtitutions for any length of time, had they not been armed. The firſt paſſage of the Koran, which gave Mahomet the permiſſion of defending himſelf by arms, is ſaid to have been that in the 22d chapter; after which a great number to the ſame purpoſe were revealed.

That Mahomet had a right to take up arms for his own defence againſt his unjuſt perſecutors, may perhaps be allowed; but whether he ought afterwards to

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have made uſe of that means for the eſtabliſhing of his religion, it is not ſo eaſy to determine. How far the ſecular power may or ought to interpoſe in affairs of this nature, mankind are not agreed. The method of converting by the ſword gives no very favourable idea of the faith which is ſo propagated, and is diſallowed by every body in thoſe of another religion, though the ſame perſons are willing to admit of it for the advancement of their own: ſuppoſing that, though a falſe religion ought not to be eſtabliſhed by authority, yet a true one may: and accordingly force is almoſt as conſtantly employed in theſe caſes by thoſe who have the power in their hands, as it is conſtantly complained of by thoſe who ſuffer the violence. It is certainly one of the moſt convincing proofs that Mahometaniſm was no other than a human invention, that it owed its progreſs and eſtabliſhment almoſt entirely to the ſword; and it is one of the ſtrongeſt demonſtrations of the divine original of Chriſtianity, that it prevailed againſt all the force and powers of the world by the mere dint of its own truth, after having ſtood the aſſaults of all manner of perſecutions, as well as other oppoſitions, for 300 years together, and at length made the Roman emperors themſelves ſubmit thereto; after which time, indeed, this proof ſeems to fail, Chriſtianity being then eſtabliſhed, and Paganiſm aboliſhed, by public authority, which has had great influence in the propagation of the one and deſtruction of the other ever ſince. But to return.

Mahomet, having provided for the ſecurity of his companions as well as his own, by the league offenſive and defenſive which he had now concluded with thoſe of Medina, directed them to repair thither, which they accordingly did; but himſelf with Abu Becr and Ali ſtaid behind, having not yet received the divine permiſſion, as he pretended, to leave Mecca. The Koreiſh fearing the conſequence of this new alliance, began to think it abſolutely neceſſary to prevent Mahomet's eſcape to Medina; and having held a council thereon, after ſeveral milder expedients had been rejected, they came to a reſolution that he ſhould be killed; and agreed that a man ſhould be choſen out of every tribe for the execution of this deſign; and that each man ſhould have a blow at him with his ſword, that the guilt of his blood might fall equally on all the tribes, to whoſe united power the Haſhemites were much inferior, and therefore durſt not attempt to revenge their kinſman's death.

This conſpiracy was ſcarce formed, when, by ſome means or other, it came to Mahomet's knowledge; and he gave out that it was revealed to him by the angel Gabriel, who had now ordered him to retire to Medina. Whereupon, to amuſe his enemies, he directed Ali to lie down in his place, and wrap himſelf up in his green cloak, which he did; and Mahomet eſcaped miraculouſly, as they pretend, to Abu Becr's houſe, unperceived by the conſpirators, who had already aſſembled at the prophet's door. They, in the mean time, looking through the crevice, and ſeeing Ali, whom they took to be Mahomet himſelf, aſleep, continued watching there till morning, when Ali aroſe, and they found themſelves deceived.

From Abu Becr's houſe Mahomet and he went to a cave in Mount Thur, to the ſouth-eaſt of Mecca, accompanied only by Amer Ebn Foheirah, Abu Becr's ſervant, and Abd'allah Ebn Oreitah, an idolater whom they had hired for a guide. In this cave they lay hid three days, to avoid the ſearch of their enemies; which they very narrowly eſcaped, and not without the aſſiſtance of more miracles than one: for ſome ſay that the Koreiſh were ſtruck with blindneſs, ſo that they could not find the cave; others, that after Mahomet and his companions were got in, two pigeons laid their eggs at the entrance, and a ſpider covered the mouth of the cave with her web, which made them look no farther. Abu Becr, ſeeing the prophet in ſuch imminent danger, became very ſorrowful; whereupon Mahomet comforted him with theſe words, recorded in the Koran, *Be not grieved, for God is with us.* Their enemies being retired, they left the cave, and ſet out for Medina, by a by-road; and having fortunately, or, as the Mahometans tell us, miraculouſly, eſcaped ſome who were ſent to purſue them, arrived ſafely at that city; whither Ali followed them in three days, after he had ſettled ſome affairs at Mecca.

The firſt thing Mahomet did after his arrival at Medina, was to build a temple for his religious worſhip, and a houſe for himſelf, which he did on a parcel of ground which had before ſerved to put camels in, or, as others tell us, for a burying-ground, and belonged to Sahal and Soheil the ſons of Amru, who were orphans. This action Dr Prideaux exclaims againſt, repreſenting it as a flagrant inſtance of injuſtice; for that, ſays he, he violently diſpoſſeſſed theſe poor orphans, the ſons of an inferior artificer (whom the author he quotes calls a *carpenter*), of this ground, and ſo founded the firſt fabric of his worſhip with the like wickedneſs as he did his religion. But, to ſay nothing of the improbability that Mahomet ſhould act in ſo impolitic a manner at his firſt coming, the Mahometan writers ſet this affair in a quite different light: one tells us that he treated with the lads about the price of the ground, but they deſired he would accept it as a preſent: however, as hiſtorians of good credit aſſure us, he actually bought it; and the money was paid by Abu Becr. Beſides, had Mahomet accepted it as a preſent, the orphans were in circumſtances ſufficient to have afforded it: for they were of a very good family, of the tribe of Najjer, one of the moſt illuſtrious among the Arabs; and not the ſons of a carpenter, as Dr Prideaux's author writes, who took the word *Najjer*, which ſignifies "a carpenter," for an appellative, whereas it is a proper name.

Mahomet, being ſecurely ſettled at Medina, and able not only to defend himſelf againſt the inſults of his enemies, but to attack them, began to ſend out ſmall parties to make repriſals on the Koreiſh; the firſt party conſiſting of no more than nine men, who intercepted and plundered a caravan belonging to that tribe, and in the action took two priſoners. But what eſtabliſhed his affairs very much, and was the foundation on which he built all his ſucceeding greatneſs, was the gaining of the battle of Bedr, which was fought in the ſecond year of the Hegira, and is ſo famous in the Mahometan hiſtory. Some reckon no leſs than 27 expeditions wherein Mahomet was perſonally preſent, in nine of which he gave battle, beſides ſeveral other expeditions in which he was not preſent.

Mahomet. His forces he maintained partly by the contributions of his followers for this purpoſe, which he called by the name of *zacat* or *alms*, and the paying of which he very artfully made one main article of his religion; and partly by ordering a fifth part of the plunder to be brought into the public treaſury for that purpoſe, in which matter he likewiſe pretended to act by the divine direction.

In a few years, by the ſucceſs of his arms (notwithſtanding he ſometimes came off by the worſt) he conſiderably raiſed his credit and power. In the ſixth year of the Hegira he ſet out with 1400 men to viſit the temple of Mecca, not with any intent of committing hoſtilities, but in a peaceable manner. However, when he came to Al Hodeibiya, which is ſituated partly within and partly without the ſacred territory, the Koreiſh ſent to let him know that they would not permit him to enter Mecca, unleſs he forced his way; whereupon he called his troops about him, and they all took a ſolemn oath of fealty or homage to him, and he reſolved to attack the city; but thoſe of Mecca ſending Arwa Ebn Maſun, prince of the tribe of Thakif, as their ambaſſador to deſire peace, a truce was concluded between them for ten years, by which any perſon was allowed to enter into league either with Mahomet, or with the Koreiſh, as he thought fit.

It may not be improper, in order to ſhow the inconceivable veneration and reſpect the Mahometans by this time had for their prophet, to mention the account which the above-mentioned ambaſſador gave the Koreiſh, at his return, of their behaviour. He ſaid he had been at the courts both of the Roman emperor and of the king of Perſia, and never ſaw any prince ſo highly reſpected by his ſubjects as Mahomet was by his companions; for, whenever he made the ablution, in order to ſay his prayers, they ran and catched the water that he had uſed; and, whenever he ſpit, they immediately licked it up, and gathered every hair that fell from him with great ſuperſtition.

In the ſeventh year of the Hegira, Mahomet began to think of propagating his religion beyond the bounds of Arabia; and ſent meſſengers to the neighbouring princes, with letters to invite them to Mahometaniſm. Nor was this project without ſome ſucceſs. Khoſru Parviz, then king of Perſia, received his letter with great diſdain, and tore it in a paſſion, ſending away the meſſenger very abruptly; which when Mahomet heard, he ſaid *God ſhall tear his kingdom.* And ſoon after a meſſenger came to Mahomet from Badhan king of Yaman, who was a dependant on the Perſians, to acquaint him that he had received orders to ſend him to Khoſru. Mahomet put off his anſwer till the next morning, and then told the meſſenger it had been revealed to him that night that Khoſru was ſlain by his ſon Shiruyeh: adding that he was well aſſured his new religion and empire ſhould riſe to as great a height as that of Khoſru; and therefore bid him adviſe his maſter to embrace Mahometaniſm. The meſſenger being returned, Badhan in a few days received a letter from Shiruyeh, informing him of his father's death, and ordering him to give the prophet no further diſturbance. Whereupon Badhan and the Perſians with him turned Mahometans.

The emperor Heraclius, as the Arabian hiſtorians aſſure us, received Mahomet's letter with great reſpect, laying it on his pillow, and diſmiſſed the bearer honourably. And ſome pretend that he would have profeſſed this new faith, had he not been afraid of loſing his crown. Mahomet.

Mahomet wrote to the ſame effect to the king of Ethiopia, though he had been converted before, according to the Arab writers; and to Mokawkas, governor of Egypt, who gave the meſſenger a very favourable reception, and ſent ſeveral valuable preſents to Mahomet, and among the reſt two girls, one of which, named Mary, became a great favourite with him. He alſo ſent letters of the like purport to ſeveral Arab princes; particularly one to Al Hareth Ebn Abi Shamar king of Ghaſſan, who returning for anſwer that he would go to Mahomet himſelf, the prophet ſaid, *May his kingdom periſh*; another to Hawdha Ebn Ali, king of Yamama, who was a Chriſtian, and, having ſome time before profeſſed Iſlamiſm, had lately returned to his former faith; this prince ſent back a very rough anſwer, upon which Mahomet curſing him, he died ſoon after: and a third to Al Monder Ebn Sawa, king of Bahrein, who embraced Mahometaniſm, and all the Arabs of that country followed his example.

The eighth year of the Hegira was a very fortunate year to Mahomet. In the beginning of it, Khaled Ebn al Walid and Amru Ebn al As, both excellent ſoldiers, the firſt of whom afterwards conquered Syria and other countries, and the latter Egypt, became proſelytes to Mahometaniſm. And ſoon after the prophet ſent 3000 men againſt the Grecian forces, to revenge the death of one of his ambaſſadors, who, being ſent to the governor of Boſra on the ſame errand as thoſe who went to the above-mentioned princes, was ſlain by an Arab, of the tribe of Ghaſſan, at Muta, a town in the territory of Balka in Syria, about three days journey eaſtward from Jeruſalem, near which town they encountered. The Grecians being vaſtly ſuperior in number (for, including the auxiliary Arabs, they had an army of 100,000 men), the Mahometans were repulſed in the firſt attack, and loſt ſucceſſively three of their generals, viz. Zeid Ebn Haretha Mahomet's freedman, Jaafar the ſon of Abu Taleb, and Abdallah Ebn Rawaha: but Khaled Ebn al Walid ſucceeding to the command, overthrew the Greeks with a great ſlaughter, and brought away abundance of rich ſpoil; on occaſion of which action Mahomet gave him the title of *Saif min ſoyaf Allah*, "one of the ſwords of God."

In this year alſo Mahomet took the city of Mecca, the inhabitants whereof had broken the truce concluded on two years before. For the tribe of Becr who were confederates with the Koreiſh, attacking thoſe of Khozaah, who were allies of Mahomet, killed ſeveral of them, being ſupported in the action by a party of the Koreiſh themſelves. The conſequence of this violation was ſoon apprehended; and Abu Soſian himſelf made a journey to Medina on purpoſe to heal the breach and renew the truce: but in vain; for Mahomet, glad of this opportunity, refuſed to ſee him: whereupon he applied to Abu Becr and Ali; but they giving him no anſwer, he was obliged to return to Mecca as he came.

Mahomet immediately gave orders for preparations to be made, that he might furpriſe the Meccans while they were unprovided to receive him: in a little time he began his march thither; and by that time he came near the city, his forces were increaſed to 10,000 men. Thoſe of Mecca, being not in a condition to defend themſelves againſt ſo formidable an army, ſurrendered at diſcretion; and Abu Sofian ſaved his life by turning Mahometan. About 28 of the idolaters were killed by a party under the command of Khaled; but this happened contrary to Mahomet's orders, who, when he entered the town, pardoned all the Koreiſh on their ſubmiſſion, except only ſix men and four women, who were more obnoxious than ordinary (ſome of them having apoſtatized), and were ſolemnly proſcribed by the prophet himſelf; but of theſe no more than three men and one woman were put to death, the reſt obtaining pardon on their embracing Mahometaniſm, and one of the women making her eſcape.

The remainder of this year Mahomet employed in deſtroying the idols in and round Mecca, ſending ſeveral of his generals on expeditions for that purpoſe, and to invite the Arabs to Iſlamiſm: wherein it is no wonder if they now met with ſucceſs.

The next year, being the ninth of the Hegira, the Mahometans call *the year of embaſſies*: for the Arabs had been hitherto expecting the iſſue of the war between Mahomet and the Koreiſh: but, ſo ſoon as that tribe, the principal of the whole nation, and the genuine deſcendants of Iſhmael, whoſe prerogatives none offered to diſpute, had ſubmitted, they were ſatisfied that it was not in their power to oppoſe Mahomet; and therefore began to come in to him in great numbers, and to ſend embaſſies to make their ſubmiſſions to him, both to Mecca, while he ſtaid there, and alſo to Medina, whither he returned this year. Among the reſt, five kings of the tribe of Hamyar profeſſed Mahometaniſm, and ſent ambaſſadors to notify the ſame.

In the 10th year, Ali was ſent into Yaman to propagate the Mahometan faith there; and, as it is ſaid, converted the whole tribe of Hamdan in one day. Their example was quickly followed by all the inhabitants of that province, except only thoſe of Najran, who, being Chriſtians, choſe rather to pay tribute.

Thus was Mahometaniſm eſtabliſhed, and idolatry rooted out, even in Mahomet's lifetime (for he died the next year), throughout all Arabia, except only Yamama, where Moſeilama, who ſet up alſo for a prophet as Mahomet's competitor, had a great party, and was not reduced till the caliphate of Abu Becr: and the Arabs being then united in one faith, and under one prince, found themſelves in a condition of making thoſe conqueſts which extended the Mahometan faith over ſo great a part of the world.

Mahomet, the name of ſeveral emperors of the Turks; of whom the moſt celebrated is,

Mahomet II. ſurnamed *the Great*, their ſeventh ſultan. See Turkey.

He was born at Adrianople the 24th of March 1430; and is to be remembered chiefly by us for taking Conſtantinople in 1453, and thereby driving many learned Greeks into the weſt, which was a great cauſe of the reſtoration of learning in Europe, as the Greek literature was then introduced here. He was one of the greateſt men upon record, with regard to the qualities neceſſary to a conqueror; for he conquered two empires, twelve kingdoms, and two hundred conſiderable cities. He was very ambitious of the title of Great, and the Turks gave it him; even the Chriſtians have not diſputed it with him; for he was the firſt of the Ottoman emperors whom the Weſtern nations dignified with the title of Grand Seignior or Great Turk, which poſterity has preſerved to his deſcendants. Italy had ſuffered greater calamities, but ſhe had never felt a terror equal to that which this ſultan's victories imprinted. The inhabitants ſeemed already condemned to wear the turban: it is certain, that Pope Sixtus IV. repreſented to himſelf Rome as already involved in the dreadful fate of Conſtantinople; and thought of nothing but eſcaping into Provence, and once more transferring the holy ſee to Avignon. Accordingly, the news of Mahomet's death, which happened the 3d of May 1481, was received at Rome with the greateſt joy that ever was beheld there. Sixtus cauſed all the churches to be thrown open, made the trades people leave off their work, ordered a feaſt of three days, with public prayers and proceſſions, commanded a diſcharge of the whole artillery of the caſtle of St Angelo all that time, and put a ſtop to his journey to Avignon.

He appears to be the firſt ſultan who was a lover of arts and ſciences; and even cultivated polite letters. He often read the Hiſtory of Auguſtus, and the other Cæſars; and he peruſed thoſe of Alexander, Conſtantine, and Theodoſius, with more than ordinary pleaſure, becauſe theſe had reigned in the ſame country with himſelf. He was fond of painting, muſic, and ſculpture; and he applied himſelf to the ſtudy of agriculture. He was much addicted to aſtrology; and uſed to encourage his troops by giving out, that the motion and influence of the heavenly bodies promiſed him the empire of the world. Contrary to the genius of his country, he delighted ſo much in the knowledge of foreign languages, that he not only ſpoke the Arabian, to which the Turkiſh laws, and the religion of their legiſlator Mahomet, are appropriated, but alſo the Perſian, the Greek, and the French, that is, the corrupted Italian. Landin, a knight of Rhodes, collected ſeveral letters which this ſultan wrote in the Syriac, Greek, and Turkiſh languages, and tranſlated them into Latin. Where the originals are, nobody knows; but the tranſlation has been publiſhed ſeveral times; as at Lyons 1520, in 4to; at Baſil 1554, 12mo; in a collection publiſhed by Oporinus, at Marpurg 1604, in 8vo; and at Leipſic 1690, in 12mo. Melchior Junius, profeſſor of eloquence at Straſburg, publiſhed at Montbeliard, 1595, a collection of letters, in which there are three written by Mahomet II. to Scanderbeg. One cannot diſcover the leaſt air of Turkiſh ferocity in theſe letters: they are written in as civil terms, and as obliging a manner, as the moſt polite prince in Chriſtendom could have written.

MAHOMETANISM, or **Mahometism**, the ſyſtem of religion broached by Mahomet, and ſtill adhered to by his followers. See **Mahomet**, and **Alcoran**.

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Mahometaniſm is profeſſed by the Turks, Perſians, and ſeveral nations among the Africans, and many among the Eaſt Indians.

The Mahometans divide their religion into two general parts, faith and practice: of which the firſt is divided into ſix diſtinct branches: Belief in God, in his angels, in his ſcriptures, in his prophets, in the reſurrection and final judgement, and in God's abſolute decrees. The points relating to practice are, prayer, with waſhings, &c. alms, faſting, pilgrimage to Mecca, and circumciſion.

I. Of the Mahometan *Faith*.] 1. That both Mahomet, and thoſe among his followers who are reckoned orthodox, had and continue to have juſt and true notions of God and his attributes, appears ſo plain from the Koran itſelf, and all the Mahometan divines, that it would be loſs of time to refute thoſe who ſuppoſe the God of Mahomet to be different from the true God, and only a fictitious deity or idol of his own creation.

2. The exiſtence of angels, and their purity, are abſolutely required to be believed in the Koran; and he is reckoned an infidel who denies there are ſuch beings, or hates any of them, or aſſerts any diſtinction of ſexes among them. They believe them to have pure and ſubtle bodies, created of fire; that they neither eat nor drink, nor propagate their ſpecies; that they have various forms and offices, ſome adoring God in different poſtures, others ſinging praiſes to him, or interceding for mankind. They hold, that ſome of them are employed in writing down the actions of men; others in carrying the throne of God, and other ſervices.

The four angels, whom they look on as more eminently in God's favour, and often mention on account of the offices aſſigned them, are, Gabriel, to whom they give ſeveral titles, particularly thoſe of the *holy ſpirit*, and the *angel of revelations*, ſuppoſing him to be honoured by God with a greater confidence than any other, and to be employed in writing down the divine decrees; Michael, the friend and protector of the Jews; Azrael, the *angel of death*, who ſeparates men's ſouls from their bodies; and Iſrafil, whoſe office it will be to ſound the trumpet at the reſurrection. The Mahometans alſo believe, that two guardian angels attend on every man, to obſerve and write down his actions, being changed every day, and therefore called *al Moakkibat*, or "the angels who continually ſucceed one another."

The devil, whom Mahomet names *Eblis*, from his *deſpair*, was once one of thoſe angels who are neareſt to God's preſence, called *Azazil;* and fell, according to the doctrine of the Koran, for refuſing to pay homage to Adam at the command of God.

Beſides angels and devils, the Mahometans are taught by the Koran to believe an intermediate order of creatures, which they call *jin* or *genii*, created alſo of fire, but of a groſſer fabric than angels, ſince they eat and drink, and propagate their ſpecies, and are ſubject to death. Some of theſe are ſuppoſed to be good and others bad, and capable of future ſalvation or damnation, as men are; whence Mahomet pretended to be ſent for the converſion of genii as well as men.

3. As to the Scriptures, the Mahometans are taught by the Koran, that God, in divers ages of the world, gave revelations of his will in writing to ſeveral prophets, the whole and every word of which it is abſolutely neceſſary for a good Moſlem to believe. The number of theſe ſacred books was, according to them, 104. Of which 10 were given to Adam, 50 to Seth, 30 to Edris or Enoch, 10 to Abraham; and the other four, being the Pentateuch, the Pſalms, the Goſpel, and the Koran, were ſucceſſively delivered to Moſes, David, Jeſus, and Mahomet; which laſt being the ſeal of the prophets, thoſe revelations are now cloſed, and no more are to be expected. All theſe divine books, except the four laſt, they agree to be now entirely loſt, and their contents unknown; though the Sabians have ſeveral books which they attribute to ſome of the antediluvian prophets. And of thoſe four, the Pentateuch, Pſalms, and Goſpel, they ſay, have undergone ſo many alterations and corruptions, that, though there may poſſibly be ſome part of the true word of God therein, yet no credit is to be given to the preſent copies in the hands of the Jews and Chriſtians. The Mahometans have alſo a goſpel in Arabic, attributed to St Barnabas; wherein the hiſtory of Jeſus Chriſt is related in a manner very different from what we find in the true goſpels, and correſpondent to thoſe traditions which Mahomet has followed in his Koran. Of this goſpel the Moriſcoes in Africa have a tranſlation in Spaniſh; and there is, in the library of Prince Eugene of Savoy, a manuſcript of ſome antiquity, containing an Italian tranſlation of the ſame goſpel; made, it is to be ſuppoſed, for the uſe of renegades. This book appears to be no original forgery of the Mahometans; though they have, no doubt, interpolated and altered it ſince, the better to ſerve their purpoſe; and in particular, inſtead of the *Paraclete*, or *Comforter*, they have in this apocryphal goſpel inſerted the word *Periclyte*, that is, the "famous," or "illuſtrious;" by which they pretend their prophet was foretold by name, that being the ſignification of *Mohammed* in Arabic: and this they ſay to juſtify that paſſage of the Koran, where Jeſus Chriſt is formally aſſerted to have foretold his coming, under his other name of *Ahmed*, which is derived from the ſame root as *Mohammed*, and of the ſame import. From theſe, or ſome other forgeries of the ſame ſtamp, it is that the Mahometans quote ſeveral paſſages, of which there are not the leaſt footſteps in the New Teſtament.

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4. The number of the prophets, which have been from time to time ſent by God into the world amounts to no leſs than 224,000, according to one Mahometan tradition; or to 124,000, according to another; among whom 313 were apoſtles, ſent with ſpecial commiſſions to reclaim mankind from infidelity and ſuperſtition; and ſix of them brought new laws or diſpenſations, which ſucceſſively abrogated the preceding; theſe were Adam, Noah, Abraham, Moſes, Jeſus, and Mahomet. All the prophets in general, the Mahometans believe to have been free from great ſins and errors of conſequence, and profeſſors of one and the ſame religion, that is, Iſlam, notwithſtanding the different laws and inſtitutions which they obſerved. They allow of degrees among them, and hold ſome of them to be more excellent and honourable than others. The firſt place they give to the revealers

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and eſtabliſhers of new diſpenſations, and the next to the apoſtles.

In this great number of prophets, they not only reckon divers patriarchs and perſons named in ſcripture, but not recorded to have been prophets, (wherein the Jewiſh and Chriſtian writers have ſometimes led the way), as Adam, Seth, Lot, Iſhmael, Nun, Joſhua, &c. and introduce ſome of them under different names, as *Enoch*, *Heber*, and *Jethro*, who are called, in the Koran, *Edris*, *Hud*, and *Shoaib*: but ſeveral others whoſe very names do not appear in Scripture (though they endeavour to find ſome perſons there to fix them on), as Saleh, Khedr, Dhu'lkefl, &c.

5. The belief of a general reſurrection and a future judgement.

When a corpſe is laid in the grave, they ſay he is received by an angel, who gives him notice of the coming of the two examiners; who are two black livid angels, of a terrible appearance, named *Monker* and *Nakir*. Theſe order the dead perſon to ſit upright; and examine him concerning his faith, as to the unity of God, and the miſſion of Mahomet: if he anſwer rightly, they ſuffer the body to reſt in peace, and it is refreſhed by the air of paradiſe; but, if not, they beat him on the temples with iron maces, till he roars out for anguiſh ſo loud, that he is heard by all from eaſt to weſt, except men and genii. They then preſs the earth on the corpſe, which is gnawed and ſtung till the reſurrection by 99 dragons, with ſeven heads each; or, as others ſay, their ſins will become venomous beaſts, the grievous ones ſtinging like dragons, the ſmaller like ſcorpions, and the others like ſerpents: circumſtances which ſome underſtand in a figurative ſenſe.

As to the ſoul, they hold, that, when it is ſeparated from the body by the angel of death, who performs his office with eaſe and gentleneſs towards the good, and with violence towards the wicked, it enters into that which they call *al berzakh*, or *the interval* between death and the reſurrection. If the departed perſon was a believer, they ſay two angels meet it, who convey it to heaven, that its place there may be aſſigned, according to its merit and degree. For they diſtinguiſh the ſouls of the faithful into three claſſes: The firſt of prophets, whoſe ſouls are admitted into paradiſe immediately; the ſecond of martyrs, whoſe ſpirits, according to a tradition of Mahomet, reſt in the crops of green birds, which eat of the fruits and drink of the rivers of paradiſe; and the third of other believers, concerning the ſtate of whoſe ſouls before the reſurrection there are various opinions.

Though ſome among the Mahometans have thought that the reſurrection will be merely ſpiritual, and no more than the returning of the ſoul to the place whence it firſt came (an opinion defended by Ebn Sina, and called by ſome the *opinion of the philoſophers*); and others, who allow man to conſiſt of body only, that it will be merely corporeal; the received opinion is, that both body and ſoul will be raiſed: and their doctors argue ſtrenuouſly for the poſſibility of the reſurrection of the body, and diſpute with great ſubtility concerning the manner of it. But Mahomet has taken care to preſerve one part of the body, whatever becomes of the reſt, to ſerve for a baſis of the future edifice, or rather a leaven for the maſs which is to be joined to it. For he taught, that a man's body was entirely conſumed by the earth, except only the bone called *al ajb*, which we name the *os coccygis*, or rumpbone; and that, as it was the firſt formed in the human body, it will alſo remain uncorrupted till the laſt day, as a ſeed from whence the whole is to be renewed; and this, he ſaid, would be effected by a forty years rain, which God ſhould ſend, and which would cover the earth to the height of 12 cubits, and cauſe the bodies to ſprout forth like plants. Herein, alſo, is Mahomet beholden to the Jews; who ſay the ſame things of the bone Luz, excepting that what he attributes to a great rain, will be effected, according to them, by a dew impregnating the duſt of the earth.

The time of the reſurrection the Mahometans allow to be a perfect ſecret to all but God alone; the angel Gabriel himſelf acknowledging his ignorance in this point, when Mahomet aſked him about it. However, they ſay, the approach of that day may be known from certain ſigns which are to precede it. Theſe ſigns they diſtinguiſh into two ſorts, the leſſer and the greater.

The leſſer ſigns are, 1. The decay of faith among men. 2. The advancing of the meaneſt perſons to eminent dignity. 3. That a maid ſervant ſhall become the mother of her miſtreſs (or maſter); by which is meant, either that towards the end of the world men ſhall be much given to ſenſuality, or that the Mahometans ſhall then take many captives. 4. Tumults and ſeditions. 5. A war with the Turks. 6. Great diſtreſs in the world, ſo that a man, when he paſſes by another's grave, ſhall ſay, Would to God I were in his place! 7. That the provinces of Irac and Syria ſhall refuſe to pay their tribute. And, 8. That the buildings of Medina ſhall reach to Ahab, or Yahab.

The greater ſigns are, 1. The ſun's riſing in the weſt; which ſome have imagined it originally did. 2. The appearance of the beaſt, which ſhall riſe out of the earth, in the temple of Mecca, or on Mount Safa, or in the territory of Tayef, or ſome other place. This beaſt, they ſay, is to be 60 cubits high; though others, not ſatisfied with ſo ſmall a ſize, will have her reach to the clouds and to heaven, when her head only is out; and that ſhe will appear for three days, but ſhow only a third part of her body. They deſcribe this monſter, as to her form, to be a compound of various ſpecies; having the head of a bull, the eyes of a hog, the ears of an elephant, the horns of a ſtag, the neck of an oſtrich, the breaſt of a lion, the colour of a tiger, the back of a cat, the tail of a ram, the legs of a camel, and the voice of an aſs. Some ſay this beaſt is to appear three times in ſeveral places, and that ſhe will bring with her the rod of Moſes and the ſeal of Solomon; and, being ſo ſwift that none can overtake or eſcape her, will with the firſt ſtrike all the believers on the face, and mark them with the word *mumen*, i. e. believer; and with the latter will mark the unbelievers on the face likewiſe, with the word *Cafer*, i. e. infidel, that every perſon may be known for what he really is. They add, that the ſame beaſt is to demonſtrate the vanity of all religions except Iſlam, and to ſpeak Arabic. All this ſtuff ſeems to be the reſult of a confuſed idea of the beaſt in the Revelation. 3. War with the Greeks, and the taking Conſtantinople by 70,000 of the poſterity of Iſaac, who ſhall

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ſhall not win that city by force of arms, but the walls ſhall fall down while they cry out, *There is no God but God, God is moſt great!* As they are dividing the ſpoil, news will come to them of the appearance of Antichriſt; whereupon they ſhall leave all, and return back. 4. The coming of Antichriſt, whom the Mahometans call *Maſih al Dajjal*, i. e. the falſe or lying Chriſt, and ſimply *al Dajjal*. He is to be one-eyed, and marked on the forehead with the letters C. F. R. ſignifying *Cafer*, or infidel. They ſay that the Jews give him the name of *Meſſiah Ben David*; and pretend he is to come in the laſt days, and to be lord both of land and ſea, and that he will reſtore the kingdom to them. 5. The deſcent of Jeſus on earth. They pretend that he is to deſcend near the white tower to the eaſt of Damaſcus, when the people are returned from the taking of Conſtantinople: that he is to embrace the Mahometan religion, marry a wife, get children, kill Antichriſt; and at length die after 40 years, or, according to others, 24 years continuance on earth. Under him, they ſay, there will be great ſecurity and plenty in the world, all hatred and malice being laid aſide; when lions and camels, bears and ſheep, ſhall live in peace, and a child ſhall play with ſerpents unhurt. 6. War with the Jews; of whom the Mahometans are to make a prodigious ſlaughter, the very trees and ſtones diſcovering ſuch of them as hide themſelves, except only the tree called *gharkad*, which is the tree of the Jews. 7. The irruption of Gog and Magog, or, as they are called in the eaſt, *Yajuj* and *Majuj*; of whom many things are related in the Koran and the traditions of Mahomet. Theſe barbarians, they tell us, having paſſed the lake of Tiberias, which the vanguard of their vaſt army will drink dry, will come to Jeruſalem, and there greatly diſtreſs Jeſus and his companions; till, at his requeſt, God will deſtroy them, and fill the earth with their carcaſes, which, after ſome time, God will ſend birds to carry away, at the prayers of Jeſus and his followers. Their bows, arrows, and quivers, the Moſlems will burn for ſeven years together; and at laſt, God will ſend a rain to cleanſe the earth and to make it fertile. 8. A ſmoke which ſhall fill the whole earth. 9. An eclipſe of the moon. Mahomet is reported to have ſaid, that there would be three eclipſes before the laſt hour; one to be ſeen in the eaſt, another in the weſt, and the third in Arabia. 10. The returning of the Arabs to the worſhip of Allat and Al Uzza, and the reſt of their ancient idols, after the deceaſe of every one in whoſe heart there was faith equal to a grain of muſtard ſeed, none but the very worſt of men being left alive. For God, they ſay, will ſend a cold odoriferous wind, blowing from Syria Damaſcena, which ſhall ſweep away the ſouls of all the faithful, and the Koran itſelf, ſo that men will remain in the groſſeſt ignorance for 100 years. 11. The diſcovery of a vaſt heap of gold and ſilver by the retreating of the Euphrates, which will be the deſtruction of many. 12. The demolition of the Caaba, or temple of Mecca, by the Ethiopians. 13. The ſpeaking of beaſts and inanimate things. 14. The breaking out of fire in the province of Hejaz; or, according to others, in Yaman. 15. The appearance of a man of the deſcendants of Kahtan, who ſhall drive men before him with his ſtaff. 16. The coming of the Mohdi, or director; concerning whom Mahomet propheſied, that the world ſhould not have an end till one of his own family ſhould govern the Arabians, whoſe name ſhould be the ſame with his own name, and whoſe father's name ſhould alſo be the ſame with his father's name; and who ſhould fill the earth with righteouſneſs. This perſon the Shiites believe to be now alive, and concealed in ſome ſecret place till the time of his manifeſtation; for they ſuppoſe him no other than the laſt of the 12 imams, named *Mahomet Abu'lkaſem*, as their prophet was; and the ſon of Haſſan al Aſkeri, the 11th of that ſucceſſion. He was born at Sermanrai, in the 255th year of the Hegira. From this tradition, it is to be preſumed, an opinion pretty current among the Chriſtians took its riſe, that the Mahometans are in expectation of their prophet's return. 17. A wind which ſhall ſweep away the ſouls of all who have but a grain of faith in their hearts, as has been mentioned under the tenth ſign.

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Theſe are the greater ſigns, which, according to their doctrine, are to precede the reſurrection, but ſtill leave the hour of it uncertain: for the immediate ſign of its being come will be the firſt blaſt of the trumpet, which they believe will be ſounded three times. The firſt they call the *blaſt of conſternation;* at the hearing of which all creatures in heaven and earth ſhall be ſtruck with terror, except thoſe whom God ſhall pleaſe to exempt from it. The effects attributed to this firſt ſound of the trumpet are very wonderful: for they ſay the earth will be ſhaken, and not only all buildings, but the very mountains levelled; that the heavens ſhall melt, the ſun be darkened, the ſtars fall, on the death of the angels, who, as ſome imagine, hold them ſuſpended between heaven and earth; and the ſea ſhall be troubled and dried up, or, according to others, turned into flames, the ſun, moon, and ſtars being thrown into it: the Koran, to expreſs the greatneſs of the terror of that day, adds, that women who give ſuck ſhall abandon the care of their infants, and even the ſhe camels which have gone 10 months with young (a moſt valuable part of the ſubſtance of that nation) ſhall be utterly neglected. A farther effect of this blaſt will be that concourſe of beaſts mentioned in the Koran, though ſome doubt whether it be to precede the reſurrection or not. They who ſuppoſe it will precede, think that all kinds of animals, forgetting their reſpective natural fierceneſs and timidity, will run together into one place, being terrified by the ſound of the trumpet and the ſudden ſhock of nature.

The Mahometans believe that this firſt blaſt will be followed by a ſecond, which they call the *blaſt of exinanition;* by which all creatures both in heaven and earth ſhall die or be annihilated, except thoſe which God ſhall pleaſe to exempt from the common fate; and this, they ſay, ſhall happen in the twinkling of an eye, nay in an inſtant; nothing ſurviving except God alone, with paradiſe and hell, and the inhabitants of thoſe two places, and the throne of glory. The laſt who ſhall die will be the angel of death.

Forty years after this will be heard the *blaſt of reſurrection*, when the trumpet ſhall be ſounded the third time by Iſrafil, who, together with Gabriel and Michael, will be previouſly reſtored to life, and, ſtanding on the rock of the temple of Jeruſalem, ſhall, at God's command, call together all the dry and rotten bones, and other diſperſed parts of the bodies, and the very

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hairs to judgement. This angel having, by the divine order, ſet the trumpet to his mouth, and called together all the ſouls from all parts, will throw them into his trumpet, from whence, on his giving the laſt ſound, at the command of God, they will fly forth like bees, and fill the whole ſpace between heaven and earth, and then repair to their reſpective bodies, which the opening earth will ſuffer to ariſe; and the firſt who ſhall ſo ariſe, according to a tradition of Mahomet, will be himſelf. For this birth the earth will be prepared by the rain above mentioned, which is to fall continually for 40 years, and will reſemble the ſeed of a man, and be ſupplied from the water under the throne of God, which is called *living water;* by the efficacy and virtue of which the dead bodies ſhall ſpring forth from their graves as they did in their mother's womb, or as corn ſprouts forth by common rain, till they become perfect; after which breath will be breathed into them, and they will ſleep in their ſepulchres till they are raiſed to life at the laſt trumpet.

When thoſe who have riſen ſhall have waited the limited time, the Mahometans believe God will at length appear to judge them; Mahomet undertaking the office of interceſſor, after it ſhall have been declined by Adam, Noah, Abraham, and Jeſus, who ſhall beg deliverance only for their own ſouls. They ſay, that on this ſolemn occaſion God will come in the clouds ſurrounded by angels, and will produce the books wherein the actions of every perſon are recorded by their guardian angels, and will command the prophets to bear witneſs againſt thoſe to whom they have been reſpectively ſent. Then every one will be examined concerning all his words and actions uttered and done by him in this life; not as if God needed any information in theſe reſpects, but to oblige the perſon to make public confeſſion and acknowledgment of God's juſtice. The particulars, of which they ſhall give an account, as Mahomet himſelf enumerated them, are, of their time, how they ſpent it; of their wealth, by what means they acquired it, and how they employed it; of their bodies, wherein they exerciſed them; of their knowledge and learning, what uſe they made of them. To the queſtions we have mentioned each perſon ſhall anſwer, and make his defence in the beſt manner he can, endeavouring to excuſe himſelf by caſting the blame of his evil deeds on others; ſo that a diſpute ſhall ariſe even between the ſoul and the body, to which of them their guilt ought to be imputed: The ſoul ſaying, *O Lord, my body I received from thee; for thou createdſt me without a hand to lay hold with, a foot to walk with, an eye to ſee with, or an underſtanding to apprehend with, till I came and entered into this body; therefore puniſh it eternally, but deliver me.* The body, on the other ſide, will make this apology: *O Lord, thou createdſt me like a ſtock of wood, having neither hand that I could lay hold with, nor foot that I could walk with, till this ſoul, like a ray of light, entered into me, and my tongue began to ſpeak, my eye to ſee, and my foot to walk; therefore puniſh it eternally, but deliver me.* But God will propound to them the following parable of the blind man and the lame man, which, as well as the preceding diſpute, was borrowed by the Mahometans from the Jews. A certain king, having a pleaſant garden, in which were ripe fruits, ſet two perſons to keep it, one of whom was blind, and the other lame; the former not being able to ſee the fruit, nor the latter to gather it: the lame man, however, ſeeing the fruit, perſuaded the blind man to take him upon his ſhoulders, and by that means he eaſily gathered the fruit, which they divided between them. The lord of the garden coming ſome time after, and inquiring after his fruit, each began to excuſe himſelf: the blind man ſaid he had no eyes to ſee with; and the lame man, that he had no feet to approach the trees. But the king, ordering the lame man to be ſet on the blind, paſſed ſentence on and puniſhed them both. And in the ſame manner will God deal with the body and the ſoul. As theſe apologies will not avail on that day, ſo it will be in vain for any one to deny his evil actions; ſince men and angels, and his own members, nay, the very earth itſelf, will be ready to bear witneſs againſt him.

At this examination, they alſo believe, that each perſon will have the book wherein all the actions of his life are written delivered to him: which books the righteous will receive into their right hand, and read with great pleaſure and ſatisfaction; but the ungodly will be obliged to take them, againſt their wills, in their left, which will be bound behind their backs, their right hand being tied up to their necks.

To ſhow the exact juſtice which will be obſerved on this great day of trial, the next thing they deſcribe is the balance, wherein all things ſhall be weighed. They ſay it will be held by Gabriel; and that it is of ſo vaſt a ſize, that its two ſcales, one of which hangs over paradiſe, and the other over hell, are capacious enough to contain both heaven and hell. Though ſome are willing to underſtand what is ſaid in the Koran concerning this balance allegorically, and only as a figurative repreſentation of God's equity; yet the more ancient and orthodox opinion is, that they are to be taken literally; and ſince words and actions, being mere accidents, are not capable of being themſelves weighed, they ſay that the books wherein they are written will be thrown into the ſcales, and according as thoſe wherein the good or evil actions are recorded ſhall preponderate, ſentence will be given: thoſe whoſe balances laden with good works ſhall be heavy, will be ſaved; but thoſe whoſe balances are light, will be condemned. Nor will any one have cauſe to complain that God ſuffers any good action to paſs unrewarded, becauſe the wicked for the good they do have their reward in this life, and therefore can expect no favour in the next.

This examination being paſt, and every one's works weighed in a juſt balance, that mutual retaliation will follow, according to which every creature will take vengeance one of another, or have ſatisfaction made them for the injuries which they have ſuffered. And, ſince there will then be no other way of returning like for like, the manner of giving this ſatisfaction will be by taking away a proportional part of the good works of him who offered the injury, and adding it to thoſe of him who ſuffered it. Which being done, if the angels (by whoſe miniſtry this is to be performed) ſay, *Lord, we have given to every one his due, and there remaineth of this perſon's good works ſo much as equalleth the weight of an ant,* God will, of his mercy, cauſe it be doubled unto him, that he may be admitted into paradiſe; but if, on the contrary, his good works be exhauſted,

hauſted, and there remain evil works only, and there be any who have not yet received ſatisfaction from him, God will order that an equal weight of their ſins be added unto his, that he may be puniſhed for them in their ſtead, and he will be ſent to hell laden with both. This will be the method of God's dealing with mankind. As to brutes, after they ſhall have likewiſe taken vengeance of one another, he will command them to be changed into duſt; wicked men being reſerved to more grievous puniſhment, ſo that they ſhall cry out, on hearing this ſentence paſſed on the brutes, *Would to God that we were duſt alſo!* As to the genii, many Mahometans are of opinion, that ſuch of them as are true believers, will undergo the ſame fate as the irrational animals, and have no other reward than the favour of being converted into duſt: and for this they quote the authority of their prophet.

The trials being over, and the aſſembly diſſolved, the Mahometans hold, that thoſe who are to be admitted into paradiſe will take the right-hand way, and thoſe who are deſtined to hell-fire will take the left; but both of them muſt firſt paſs the bridge called in Arabic *al Sirat*, which they ſay is laid over the midſt of hell, and deſcribe to be finer than a hair, and ſharper than the edge of a ſword; ſo that it ſeems very difficult to conceive how any one ſhall be able to ſtand upon it; for which reaſon, moſt of the ſect of the Motazalites reject it as a fable; though the orthodox think it a ſufficient proof of the truth of this article, that it was ſeriouſly affirmed by him who never aſſerted a falſehood, meaning their prophet: who, to add to the difficulty of the paſſage, has likewiſe declared, that this bridge is beſet on each ſide with briars and hooked thorns: which will however be no impediment to the good; for they ſhall paſs with wonderful eaſe and ſwiftneſs, like lightning, or the wind, Mahomet and his Moſlems leading the way; whereas the wicked, what with the ſlipperineſs and extreme narrowneſs of the path, the entangling of the thorns, and the extinction of the light which directed the former to paradiſe, will ſoon miſs their footing, and fall down headlong into hell, which is gaping beneath them.

As to the puniſhment of the wicked, the Mahometans are taught, that hell is divided into ſeven ſtories or apartments, one below another, deſigned for the reception of as many diſtinct claſſes of the damned.

The firſt, which they call *Jehennam*, they ſay, will be the receptacle of thoſe who acknowledge one God, that is, the wicked Mahometans; who, after having there been puniſhed according to their demerits, will at length be releaſed. The ſecond, named *Ladha*, they aſſign to the Jews; the third, named *al Hotama*, to the Chriſtians; the fourth, named *al Sair*, to the Sabians; the fifth, named *Sakar*, to the Magians; the ſixth, named *al Jahim*, to the idolaters; and the ſeventh, which is the loweſt and worſt of all, and is called *al Hawyat*, to the hypocrites, or thoſe who outwardly profeſſed ſome religion, but in their hearts were of none. Over each of theſe apartments they believe there will be ſet a guard of angels, 19 in number; to whom the damned will confeſs the juſt judgement of God, and beg them to intercede with him for ſome alleviation of their pain, or that they may be delivered by being annihilated.

Mahomet has, in his Koran and traditions, been very exact in deſcribing the various torments of hell, which, according to him, the wicked will ſuffer both from intenſe heat and exceſſive cold. We ſhall, however, enter into no detail of them here; but only obſerve, that the degrees of theſe pains will alſo vary in proportion to the crimes of the ſufferer, and the apartment he is condemned to; and that he who is puniſhed the moſt lightly of all will be ſhod with ſhoes of fire, the fervour of which will cauſe his ſkull to boil like a cauldron. The condition of theſe unhappy wretches, as the ſame prophet teaches, cannot be properly called either *life* or *death*; and their miſery will be greatly increaſed by their deſpair of being ever delivered from that place, ſince, according to that frequent expreſſion in the Koran, *they muſt remain therein for ever*. It muſt be remarked, however, that the infidels alone will be liable to eternity of damnation; for the Moſlems, or thoſe who have embraced the true religion, and have been guilty of heinous ſins, will be delivered thence after they ſhall have expiated their crimes by their ſufferings. The time which theſe believers ſhall be detained there, according to a tradition handed down from their prophet, will not be leſs than 900 years, nor more than 7000. And, as to the manner of their delivery, they ſay that they ſhall be diſtinguiſhed by the marks of proſtration on thoſe parts of their bodies with which they uſed to touch the ground in prayer, and over which the fire will therefore have no power; and that, being known by this characteriſtic, they will be releaſed by the mercy of God, at the interceſſion of Mahomet and the bleſſed: whereupon thoſe who ſhall have been dead, will be reſtored to life, as has been ſaid; and thoſe whoſe bodies ſhall have contracted any ſootineſs or filth from the flames and ſmoke of hell, will be immerſed in one of the rivers of paradiſe, called the *river of life*, which will waſh them whiter than pearls.

The righteous, as the Mahometans are taught to believe, having ſurmounted the difficulties, and paſſed the ſharp bridge above mentioned, before they enter paradiſe, will be refreſhed by drinking at the *pond* of their prophet, who deſcribes it to be an exact ſquare of a month's journey in compaſs; its water, which is ſupplied by two pipes from Al Cawthar, one of the rivers of paradiſe, being whiter than milk or ſilver, and more odoriferous than muſk, with as many cups ſet around it as there are ſtars in the firmament; of which water whoever drinks will thirſt no more for ever. This is the firſt taſte which the bleſſed will have of their future and now near approaching felicity.

Though paradiſe be ſo very frequently mentioned in the Koran, yet it is a diſpute among the Mahometans whether it be already created, or to be created hereafter; the Motazalites and ſome other ſectaries aſſerting, that there is not at preſent any ſuch place in nature, and that the paradiſe which the righteous will inhabit in the next life will be different from that from which Adam was expelled. However, the orthodox profeſs the contrary, maintaining that it was created even before the world, and deſcribe it, from their prophet's traditions, in the following manner:

They ſay it is ſituated above the ſeven heavens (or in the ſeventh heaven), and next under the throne of God; and, to expreſs the amenity of the place, tell us, that the earth of it is of the fineſt wheat flour, or of the pureſt muſk, or, as others will have it, of ſaffron: that its ſtones are pearls and jacinths, the walls of its buildings enriched with gold and ſilver; and that the trunks of all its trees are of gold, among which the moſt remarkable is the tree call *Tuba*, or the tree of happineſs. Concerning this tree, they fable, that it ſtands in the palace of Mahomet, though a branch of it will reach to the houſe of every true believer; that it will be laden with pomegranates, grapes, dates, and other fruits, of ſurpriſing bigneſs, and of taſtes unknown to mortals. So that if a man deſire to eat of any particular kind of fruit, it will immediately be preſented him; or, if he chooſe fleſh, birds ready dreſſed will be ſet before him, according to his wiſh. They add, that the boughs of this tree will ſpontaneouſly bend down to the hand of the perſon who would gather of its fruits, and that it will ſupply the bleſſed not only with food, but alſo with ſilken garments, and beaſts to ride on ready ſaddled and bridled, and adorned with rich trappings, which will burſt forth from its fruits; and that this tree is ſo large, that a perſon, mounted on the fleeteſt horſe, would not be able to gallop from one end of its ſhade to the other in 100 years.

As plenty of water is one of the greateſt additions to the pleaſantneſs of any place, the Koran often ſpeaks of the rivers of paradiſe as a principal ornament thereof: ſome of theſe rivers, they ſay, flow with water, ſome with milk, ſome with wine, and others with honey; all taking their riſe from the root of the tree Tuba.

But all theſe glories will be eclipſed by the reſplendent and raviſhing girls of paradiſe, called from their large black eyes *Hur al oyun*, the enjoyment of whoſe company will be a principal felicity of the faithful. Theſe, they ſay, are created, not of clay, as mortal women are, but of pure muſk; being, as their prophet often affirms in his Koran, free from all natural impurities, defects, and inconveniences incident to the ſex, of the ſtricteſt modeſty, and ſecluded from public view in pavilions of hollow pearls, ſo large, that as ſome traditions have it, one of them will be no leſs than four paraſangs (or, as others ſay, 60 miles) long, and as many broad.

The name which the Mahometans uſually give to this happy manſion, is *al Jannat*, or "the garden;" and ſometimes they call it, with an addition, *Jannat al Ferdaws*, "the garden of paradiſe;" *Jannat Aden*, "the garden of Eden," (though they generally interpret the word *Eden*, not according to its acceptation in Hebrew, but according to its meaning in their own tongue, wherein it ſignifies "a ſettled or perpetual habitation;") *Jannat al Mawa*, "the garden of abode;" *Jannat al Naim*, "the garden of pleaſure;" and the like: by which ſeveral appellations ſome underſtand ſo many different gardens, or at leaſt places of different degrees of felicity (for they reckon no leſs than 100 ſuch in all), the very meaneſt whereof will afford its inhabitants ſo many pleaſures and delights, that one would conclude they muſt even ſink under them, had not Mahomet declared, that, in order to qualify the bleſſed for a full enjoyment of them, God will give to every one the abilities of 100 men.

6. God's abſolute decree and predeſtination both of good and evil. The orthodox doctrine is, that whatever hath or ſhall come to paſs in this world, whether it be good, or whether it be bad, proceedeth entirely from the divine will, and is irrevocably fixed and recorded from all eternity in the preſerved table: God having ſecretly predetermined not only the adverſe and proſperous fortune of every perſon in this world, in the moſt minute particulars, but alſo his faith or infidelity, his obedience or diſobedience, and conſequently his everlaſting happineſs or miſery after death; which fate or predeſtination it is not poſſible by any foreſight or wiſdom to avoid.

Of this doctrine Mahomet makes great uſe in his Koran for the advancement of his deſigns; encouraging his followers to fight without fear, and even deſperately, for the propagation of their faith, by repreſenting to them, that all their caution could not avert their inevitable deſtiny, or prolong their lives for a moment; and deterring them from diſobeying or rejecting him as an impoſtor, by ſetting before them the danger they might thereby incur of being, by the juſt judgement of God, abandoned to ſeduction, hardneſs of heart, and a reprobate mind, as a puniſhment for their obſtinacy.

II. *Religious practice.* 1. The firſt point is *prayer*, under which are alſo comprehended thoſe legal waſhings or purifications which are neceſſary preparations thereto.

Of theſe purifications there are two degrees, one called *ghoſl*, being a total immerſion or bathing of the body in water; and the other called *wodu* (by the Perſians, *abdeſt*), which is the waſhing of their faces, hands, and feet, after a certain manner. The firſt is required in ſome extraordinary caſes only, as after having lain with a woman, or being polluted by emiſſion of ſeed, or by approaching a dead body; women alſo being obliged to it after their courſes or childbirth. The latter is the ordinary ablution in common caſes, and before prayer, and muſt neceſſarily be uſed by every perſon before he can enter upon that duty. It is performed with certain formal ceremonies, which have been deſcribed by ſome writers, but much eaſier apprehended by ſeeing them done, than by the beſt deſcription.

That his followers might be more punctual in this duty, Mahomet is ſaid to have declared, that *the practice of religion is founded on cleanlineſs*, which is the *one half of the faith*, and the *key of prayer*, without which it will not be heard by God. That theſe expreſſions may be the better underſtood, Al Ghazali reckons four degrees of purification; of which the firſt is the cleanſing of the body from all pollution, filth, and excrements; the ſecond, the cleanſing of the members of the body from all wickedneſs and unjuſt actions; the third, the cleanſing the heart from all blameable inclinations and odious vices; and the fourth, the purging a man's ſecret thoughts from all affections which may divert their attendance on God; adding, that the body is but as the outward ſhell, in reſpect to the heart, which is as the kernel.

Circumciſion, though it be not ſo much as once mentioned in the Koran, is yet held by the Mahometans to be an ancient divine inſtitution, confirmed by the religion of Iſlam, and though not ſo abſolutely neceſſary but that it may be diſpenſed with in ſome caſes,

Mahometanism.

caſes, yet highly proper and expedient. The Arabs uſed this rite for many ages before Mahomet, having probably learned it from Iſhmael, though not only his deſcendants, but the Hamyarites and other tribes practiſed the ſame. The Iſhmaelites, we are told, uſed to circumciſe their children, not on the eighth day, as is the cuſtom of the Jews, but when about 12 or 13 years old, at which age their father underwent that operation; and the Mahometans imitate them ſo far as not to circumciſe children before they may be able at leaſt diſtinctly to pronounce that profeſſion of their faith, *There is no* God *but* GOD, Mahomet *is the apoſtle of* GOD; but pitch on what age they pleaſe for the purpoſe, between 6 and 16 or thereabouts.

Prayer was by Mahomet thought ſo neceſſary a duty, that he uſed to call it *the pillar of religion* and *the key of paradiſe;* and when the Thakifites, who dwelt at Tayef, ſending, in the ninth year of the Hegira, to make their ſubmiſſion to the prophet, after the keeping of their favourite idol had been denied them, begged at leaſt that they might be diſpenſed with as to their ſaying of their appointed prayers, he anſwered, *That there could be no good in that religion wherein was no prayer.*

That ſo important a duty, therefore, might not be neglected, Mahomet obliged his followers to pray five times every 24 hours, at certain ſtated times; viz. 1. In the morning before ſunriſe: 2. When noon is paſt, and the ſun begins to decline from the meridian: 3. In the afternoon, before ſunſet: 4. In the evening, after ſunſet, and before the day be ſhut in; and, 5. After the day is ſhut in, and before the firſt watch of the night. For this inſtitution he pretended to have received the divine command from the throne of God himſelf, when he took his night-journey to heaven; and the obſerving of the ſtated times of prayer is frequently inſiſted on in the Koran, though they be not particularly preſcribed therein. Accordingly, at the aforeſaid times, of which public notice is given by the Muedhdhins, or Criers, from the ſteeples of their moſques (for they uſe no bells), every conſcientious Moſlem prepares himſelf for prayer, which he performs either in the moſque or any other place, provided it be clean, after a preſcribed form, and with a certain number of praiſes or ejaculations (which the more ſcrupulous count by a ſtring of beads), and uſing certain poſtures of worſhip; all which have been particularly ſet down and deſcribed, though with ſome few miſtakes, by other writers, and ought not to be abridged, unleſs in ſome ſpecial caſes, as on a journey, on preparing for battle, &c.

For the regular performance of the duty of prayer among the Mahometans, beſides the particulars above mentioned, it is alſo requiſite that they turn their faces, while they pray, towards the temple of Mecca; the quarter where the ſame is ſituated, being, for that reaſon, pointed out within their moſques by a niche, which they call *al Mehrab;* and without, by the ſituation of the doors opening into the galleries of the ſteeples: there are alſo tables calculated for the ready finding out their Keblah, or part towards which they ought to pray, in places where they have no other direction.

2. *Alms* are of two ſorts, *legal* and *voluntary*. The *legal alms* are of indiſpenſable obligation, being commanded by the law, which directs and determines both the portion which is to be given, and of what things it ought to be given; but the *voluntary alms* are left to every one's liberty, to give more or leſs, as he ſhall ſee fit. The former kind of alms ſome think to be properly called *zacat*, and the latter *ſadakat;* though this name be alſo frequently given to the legal alms. They are called *zacat*, either becauſe they *increaſe* a man's ſtore by drawing down a bleſſing thereon, and produce in his ſoul the virtue of liberality; or becauſe they *purify* the remaining part of one's ſubſtance from pollution, and the ſoul from the filth of avarice; and *ſadakat*, becauſe they are a proof of a man's ſincerity in the worſhip of God. Some writers have called the legal alms *tithes;* but improperly, ſince in ſome caſes they fall ſhort, and in others exceed that proportion.

3. *Faſting* is a duty of ſo great moment, that Mahomet uſed to ſay it was *the gate of religion* and that the *odour of the mouth of him who faſteth is more grateful to* GOD *than that of muſk;* and Al Ghazali reckons faſting *one fourth part of the faith.* According to the Mahometan divines, there are three degrees of faſting: 1. The reſtraining the belly and other parts of the body from ſatisfying their luſts: 2. The reſtraining the ears, eyes, tongue, hands, feet, and other members, from ſin; and, 3. The faſting of the heart from worldly cares, and reſtraining the thought from every thing beſides God.

The Mahometans are obliged, by the expreſs command of the Koran, to faſt the whole month of Ramadan from the time the new moon firſt appears, till the appearance of the next new moon; during which time they muſt abſtain from eating, drinking, and women, from daybreak till night or ſunſet. And this injunction they obſerve ſo ſtrictly, that, while they faſt, they ſuffer nothing to enter their mouths, or other parts of their body, eſteeming the faſt broken and null, if they ſmell perfumes, take a clyſter or injection, bathe, or even purpoſely ſwallow their ſpittle; ſome being ſo cautious, that they will not open their mouths to ſpeak leſt they ſhould breathe the air too freely: the faſt is alſo deemed void, if a man kiſs or touch a woman, or if he vomit deſignedly. But after ſunſet they are allowed to refreſh themſelves, and to eat and drink, and enjoy the company of their wives till daybreak; though the more rigid begin the faſt again at midnight. This faſt is extremely rigorous and mortifying when the month of Ramadan happens to fall in ſummer (for the Arabian year being lunar, each month runs through all the different ſeaſons in the courſe of 33 years), the length and heat of the days making the obſervance of it much more difficult and uneaſy than in winter.

The reaſon given why the month of Ramadan was pitched on for this purpoſe is, that on that month the Koran was ſent down from heaven. Some pretend, that Abraham, Moſes, and Jeſus, received their reſpective revelations in the ſame month.

4. The pilgrimage to Mecca is ſo neceſſary a point of practice, that, according to a tradition of Mahomet, he who dies without performing it may as well die a Jew or a Chriſtian; and the ſame is expreſsly commanded in the Koran.

The temple of Mecca ſtands in the midſt of the city, and is honoured with the title of *Masjad al elharam*, i. e. *the ſacred or inviolable temple.* What is principally ly reverenced in this place, and gives ſanctity to the whole, is a ſquare ſtone building, called the CAABA; (ſee that article).

To this temple every Mahometan, who has health and means ſufficient, ought, once at leaſt in his life, to go on pilgrimage; nor are women excuſed from the performance of this duty. The pilgrims meet at different places near Mecca, according to the different parts from whence they come, during the months of Shawal and Dhu'lkaada; being obliged to be there by the beginning of Dhu'lhajja; which month, as its name imports, is peculiarly ſet apart for the celebration of this ſolemnity.

At the place above mentioned the pilgrims properly commence ſuch; when the men put on the Ibram or ſacred habit, which conſiſts only of two woollen wrappers, one wrapped about their middle to cover their privities, and the other thrown over their ſhoulders, having their heads bare, and a kind of ſlippers which cover neither the heel nor the inſtep, and ſo enter the ſacred territory in their way to Mecca. While they have this habit on, they muſt neither hunt nor fowl, (though they are allowed to fiſh); which precept is ſo punctually obſerved, that they will not kill even a louſe or flea if they find them on their bodies: there are ſome noxious animals, however, which they have permiſſion to kill during the pilgrimage, as kites, ravens, ſcorpions, mice, and dogs given to bite. During the pilgrimage, it behoves a man to have a conſtant guard over his words and actions; to avoid all quarrelling or ill language, all converſe with women, and all obſcene diſcourſe; and to apply his whole attention to the good work he is engaged in.

The pilgrims, being arrived at Mecca, immediately viſit the temple; and then enter on the performance of the preſcribed ceremonies, which conſiſt chiefly in going in proceſſion round the Caaba, in running between the mounts Safa and Merwa, in making the ſtation on Mount Arafat, and ſlaying the victims, and ſhaving their heads in the valley of Mina.

In compaſſing the Caaba, which they do ſeven times, beginning at the corner where the black ſtone is fixed, they uſe a ſhort quick pace the three firſt times they go round it, and a grave ordinary pace the four laſt; which, it is ſaid, was ordered by Mahomet, that his followers might ſhow themſelves ſtrong and active to cut off the hopes of the infidels, who gave out that the immoderate heats of Medina had rendered them weak. But the aforeſaid quick pace they are not obliged to uſe every time they perform this piece of devotion, but only at ſome particular times. So often as they paſs by the black ſtone, they either kiſs it, or touch it with their hand, and kiſs that.

The running between Safa and Merwa is alſo performed ſeven times, partly with a ſlow pace and partly running: for they walk gravely till they come to a place between two pillars; and there they run, and afterwards walk again; ſometimes looking back, and ſometimes ſtooping, like one who had loſt ſomething, to repreſent Hagar ſeeking water for her ſon: for the ceremony is ſaid to be as ancient as her time.

On the ninth of Dhu'lhajja, after morning prayer, the pilgrims leave the valley of Mina, whither they come the day before; and proceed in a tumultuous and ruſhing manner to Mount Arafat, where they ſtay to perform their devotions till ſunſet: then they go to Mozdalifa, an oratory between Arafat and Mina; and there ſpend the night in prayer and reading the Koran. The next morning by daybreak they viſit *al Maſher al Karam*, or "the ſacred monument;" and, departing thence before ſunriſe, haſte by Batn Mohaſſer to the valley of Mina, where they throw ſeven ſtones at three marks or pillars, in imitation of Abraham, who, meeting the devil in that place, and being by him diſturbed in his devotions, or tempted to diſobedience when he was going to ſacrifice his ſon, was commanded by God to drive him away by throwing ſtones at him; though others pretend this rite to be as old as Adam, who alſo put the devil to flight in the ſame place, and by the ſame means.

This ceremony being over, on the ſame day, the tenth of Dhu'lhajja, the pilgrims ſlay their victims in the ſaid valley of Mina; of which they and their friends eat part, and the reſt is given to the poor. Theſe victims muſt be either ſheep, goats, kine, or camels: males, if of either of the two former kinds; and females if of either of the latter; and of a fit age. The ſacrifices being over, they ſhave their heads and cut their nails, burying them in the ſame place; after which the pilgrimage is looked on as completed: though they again viſit the Caaba, to take their leave of that ſacred building.

The rapid ſucceſs which attended the propagation of this new religion was owing to cauſes that are plain and evident, and muſt remove, or rather prevent, our ſurpriſe, when they are attentively conſidered. The terror of Mahomet's arms, and the repeated victories which were gained by him and his ſucceſſors, were, no doubt, the irreſiſtible arguments that perſuaded ſuch multitudes to embrace his religion and ſubmit to his dominion. Beſides, his law was artfully and marvellouſly adapted to the corrupt nature of man; and, in a more particular manner, to the manners and opinions of the eaſtern nations, and the vices to which they were naturally addicted: for the articles of faith which it propoſed were few in number, and extremely ſimple; and the duties it required were neither many nor difficult, nor ſuch as were incompatible with the empire of appetites and paſſions. It is to be obſerved farther, that the groſs ignorance, under which the Arabians, Syrians, Perſians, and the greateſt part of the eaſtern nations, laboured at this time, rendered many an eaſy prey to the artifice and eloquence of this bold adventurer. To theſe cauſes of the progreſs of Mahometaniſm, we may add the bitter diſſenſions and cruel animoſities that reigned among the Chriſtian ſects, particularly the Greeks, Neſtorians, Eutychians, and Monophyſites; diſſenſions that filled a great part of the eaſt with carnage, aſſaſſinations, and ſuch deteſtable enormities as rendered the very name of Chriſtianity odious to many. We might add here, that the Monophyſites and Neſtorians, full of reſentment againſt the Greeks, from whom they had ſuffered the bittereſt and moſt injurious treatment, aſſiſted the Arabians in the conqueſt of ſeveral provinces, into which, of conſequence, the religion of Mahomet was afterwards introduced. Other cauſes of the ſudden progreſs of that religion will naturally occur to ſuch as conſider attentively its ſpirit and genius, and the ſtate of the world at this time.

Mahometans || Mahwah.

MAHOMETANS, thoſe who believe in the religion and divine miſſion of Mahomet. See MAHOMET, MAHOMETANISM, and ALCORAN.

MAHRATTA. See MARHATTA.

MAHWAH, or MAWEE, in *Botany*; an Eaſt Indian tree, ſo called by the natives of Bahar and the neighbouring countries, but of which the Shanſcrit name is *Madhuca* or *Madhudruma*. According to Lieut. C. Hamilton, by whom a very particular account of this tree is given in the Aſiatic Reſearches *, it is of the claſs of the polyandria-monogynia of Linnæus, but of a genus not deſcribed by him.

The tree, when full grown, is about the ſize of a common mango tree, with a buſhy head and oval leaves a little pointed; its roots ſpreading horizontally, are ſunk but little in the earth; the trunk, which is often of a conſiderable thickneſs, riſes ſeldom to any great height, without giving off branches; it is, however, not uncommon to ſee it ſhoot up clear to the length of eight or ten feet: the wood itſelf is moderately hard, fine grained, and of a reddiſh colour. By inciſion the tree affords a reſinous gum from the bark.

The flowers are of a nature very extraordinary, "differing eſſentially (ſays Mr Hamilton) from thoſe of any other plant with which I am acquainted, as they have not, in any reſpect, the uſual appearance of ſuch, but rather reſemble *berries*; and I, like many others, had long conceived them to be the fruit of the Mahwah." The tree drops its leaves in the month of February, and early in March theſe flowers begin to come out in cluſters of thirty, forty, or fifty, from the extremity of every ſmall branch; and, from this period till the latter end of April, as the flowers come to maturity (for they never open or expand), they continue falling off, with their antheræ, in the mornings, a little after ſunriſe; when they are gathered; and afterwards dried by an expoſure of a few days in the ſun: when thus prepared, they very much reſemble a dried grape, both in taſte and flavour. Immediately after the flowers drop off, freſh ſhoots are made for the new leaves, which ſoon make their appearance, coming preſently to their full growth.

The fruit (*properly* ſo called) is of two ſorts in ſhape; the one reſembling a ſmall walnut, the other ſomewhat larger and pointed: it is ripe towards the middle of May; and continues dripping from the tree till the whole fall, which is generally about the beginning or towards the middle of June. The outer covering, or *pericarpium*, which is of a ſoft texture, commonly burſts in the fall, ſo that the ſeeds are very eaſily ſqueezed out of it: the ſeeds are ſomewhat of the ſhape, but longer than an olive. Theſe ſeeds are replete with a thick oil, of the conſiſtence of butter or *ghee*, which is obtained by expreſſion.

From this deſcription it may eaſily be conceived, that the Mahwah tree and its productions are of ſingular and general uſe, eſpecially in thoſe dry and barren countries, which, from the nature of their ſituation, are not ſo well calculated for producing in plenty or perfection the other neceſſaries of life.

The corolla or flowers, after being dried as before deſcribed, are eaten by the natives raw or dreſſed with their *curries*; and, when even ſimply boiled with rice, they afford a ſtrengthening and wholeſome nouriſhment. They are indeed, our author tells us, often applied to a leſs laudable purpoſe: for being fermented, they yield by diſtillation a ſtrong ſpirit, which the people here ſell ſo very cheap, that for one *pice* (about a halfpenny) may be purchaſed no leſs than a *cutcha ſeer* (above a pint Engliſh) with which any man may get completely drunk. Theſe flowers make an article of trade; being exported from this country to Patna and elſewhere in no inconſiderable quantities.

Mahwah, Maiden.

The oil yielded by the fruit, as before mentioned, reſembles ghee ſo much, that, being cheaper, the natives often mix it with that commodity. They uſe it the ſame as ghee in their victuals, and in the compoſition of ſome ſorts of ſweetmeats; and burn it in their lamps. It is alſo regarded as a ſalutary remedy, applied exteriorly to wounds and all cutaneous eruptions. It is at firſt of the conſiſtence of common oil, but ſoon coagulates: after being kept for ſome time, it acquires a bitteriſh taſte and rancid ſmell, which renders it ſomewhat leſs agreeable as an article of food: but this is an inconvenience which, by the oil being properly clarified and prepared at firſt, might be perhaps avoided. This oil is alſo exported both in its adulterated and original ſtate to Patna and other parts of the low country. The gum has not been applied to any uſe: but might be collected in large quantities in the months of March and April, about the time the flowers come out.

MAIA, in fabulous hiſtory, the daughter of Atlas and Pleione. She was the mother of Mercury by Jupiter. She was one of the Pleiades, the moſt luminous of the ſeven ſiſters; (ſee PLEIADES). Alſo, a ſurname of Cybele.

MAIDEN, an inſtrument for beheading criminals.

Of the uſe and form of this inſtrument Mr Pennant gives the following account: "It ſeems to have been confined to the limits of the foreſt of Hardwick, or the 18 towns and hamlets within its precincts. The time when this cuſtom took place is unknown; whether Earl Warren, lord of this foreſt, might have eſtabliſhed it among the ſanguinary laws then in uſe againſt the invaders of the hunting rights, or whether it might not take place after the woollen manufactures at Halifax began to gain ſtrength, is uncertain. The laſt is very probable; for the wild country around the town was inhabited by a lawleſs ſet, whoſe depredations on the cloth-tenters might ſoon ſtifle the efforts of infant induſtry. For the protection of trade, and for the greater terror of offenders by ſpeedy execution, this cuſtom ſeems to have been eſtabliſhed, ſo as at laſt to receive the force of law, which was, 'That, if a felon be taken within the liberty of the foreſt of Hardwick, with goods ſtolen out, or within the ſaid precincts, either hand-habend, back-berand, or confeſſion'd, to the value of thirteen pence halfpenny, he ſhall, after three market days or meeting-days within the town of Halifax, next after ſuch his apprehenſion, and being condemned, be taken to the gibbet, and there have his head cut from his body.'

"The offender had always a fair trial; for as ſoon as he was taken, he was brought to the lord's bailiff at Halifax: he was then expoſed on the three markets (which here were held thrice in a week), placed in a ſtocks, with the goods ſtolen on his back, or, if the theft was of the cattle kind, they were placed by him; and this was done both to ſtrike terror into others,

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* Vol. I. art. xiv.

and to produce new informations againſt him. The bailiff then ſummoned four freeholders of each town within the foreſt to form a jury. The felon and proſecutors were brought face to face; and the goods, the cow or horſe, or whatſoever was ſtolen, produced. If he was found guilty, he was remanded to priſon, had a week's time allowed for preparation, and then was conveyed to this ſpot, where his head was ſtruck off by this machine. I ſhould have premiſed, that if the criminal, either after apprehenſion, or in the way to execution, could eſcape out of the limits of the foreſt (part being cloſe to the town), the bailiff had no farther power over him; but if he ſhould be caught within the precincts at any time after, he was immediately executed on his former ſentence.

"This privilege was very freely uſed during the reign of Elizabeth: the records before that time were loſt. Twenty-five ſuffered in her reign, and at leaſt 12 from 1623 to 1650; after which I believe the privilege was no more exerted.

"This machine of death is now deſtroyed; but I ſaw one of the ſame kind in a room under the parliament houſe at Edinburgh, where it was introduced by the regent Morton, who took a model of it as he paſſed through Halifax, and at length ſuffered by it himſelf. It is in form of a painter's eaſel, and about ten feet high: at four feet from the bottom is a croſs bar on which the felon lays his head, which is kept down by another placed above. In the inner edges of the frame are grooves; in theſe is placed a ſharp axe, with a vaſt weight of lead, ſupported at the very ſummit with a peg: to that peg is faſtened a cord, which the executioner cutting, the axe falls, and does the affair effectually, without ſuffering the unhappy criminal to undergo a repetition of ſtrokes, as has been the caſe in the common method. I muſt add, that if the ſufferer is condemned for ſtealing a horſe or a cow, the ſtring is tied to the beaſt, which, on being whipped, pulls out the peg, and becomes the executioner." This apparatus is now in poſſeſſion of the Scottiſh Antiquarian Society.

Maiden is alſo the name of a machine firſt uſed in Yorkſhire, and ſince introduced into other places, for waſhing linen; conſiſting of a tub 19 inches high, and 27 in diameter at the top, in which the linen is put, with hot water and ſoap, to which is adapted a cover, fitting it very cloſely, and faſtened to the tub by two wedges; through a hole in the middle of the cover paſſes an upright piece of wood, kept at a proper height by a peg above, and furniſhed with two handles, by which it is turned backward and forward: to the lower end of this upright piece is faſtened a round piece of wood, in which are fixed ſeveral pieces, like cogs of a wheel. The operation of this machine is to make the linen paſs and repaſs quick through the water.

Maiden-Rents, in our old writers, a noble paid by the tenants of ſome manors on their marriage. This was ſaid to be given to the lord for his omitting the cuſtom of marcheta, whereby he was to have the firſt night's lodging with his tenant's wife; but it ſeems more probably to have been a fine for a licenſe to marry a daughter.

MAIDENHEAD, a town of Berks, 26 miles from London, with a ſtone bridge over the Thames. It is governed by a high ſteward, a mayor, a ſteward, and 10 aldermen, out of which laſt two bridgemaſters are choſen every year. Here is a gaol both for debtors and felons. The town ſtands partly in the pariſh of Bray and partly in that of Cookham; and here is a chapel peculiar to the corporation, the miniſter whereof is choſen by the inhabitants, and not obliged to attend the biſhop's viſitation. Here are ſeveral alms-houſes and charities. This town, now ſo conſiderable, did not begin to flouriſh till, by the building of its bridge, travellers were brought this way, who before uſed a ferry at that called *Babham's End*, two miles north of it. The barge pier bridge is maintained by the corporation, for which they are allowed the tolls both over and under it. The bridge-pier divides Berks from Bucks. There is a great trade here in malt, meal, and timber, which they carry in their barges to London. As this is the great thoroughfare from thence to Bath, Briſtol, and other ſouth-weſt parts of England, the adjacent wood or thicket has been noted for many robberies. The market here is on Wedneſdays; there are three fairs; and here are frequent horſe races.

MAIDSTONE, a town of Kent, in England, 36 miles from London, ſeated on the river Medway, a branch of which runs through it. It is a corporation, and ſends two members to parliament. Its chief trade, beſides linen-thread, which is made in great perfection, is in hops; of which there are great plenty of plantations about the town, as well as orchards of cherries. The tide flows quite up to the town, and brings up barges, &c. of 50 or 60 tons. It has a fine ſtone bridge. One of the public gaols for the county is kept in this town; and the cuſtody of weights and meaſures, renewed by the ſtandard of King Henry VII. was committed to it by parliament, as being in the centre of Kent: for which reaſon the knights of the ſhire are always elected, and the courts of juſtice always held here, and generally the aſſizes. The archbiſhop of Canterbury is conſtant parſon of this pariſh, which is his peculiar, and ſerved by his curate. Here are four charity-ſchools, in which are above 100 boys and girls, who are viſited once a-week and catechiſed by the miniſter. This is ſuch a plentiful country, and the lands hereabouts are ſo rich, that London is ſupplied with more commodities from hence than from any market-town in England; particularly with the large bullocks that come from the Weald of Kent, which begins but ſix miles off; with timber, wheat, and great quantities of hops, apples, and cherries; with a ſort of paving-ſtone, eight or ten inches ſquare, that is exceeding durable; and with the fine white ſand for glaſs-houſes and ſtationers. There are ſo many gentlemen's ſeats within 10 miles, that it is rare to find a town of ſo much trade and buſineſs, ſo full of gentry and good company.

MAIENNE, a conſiderable, handſome, and populous town in France, formerly having the title of a duchy; ſeated on a river of the ſame name, in W. Long. 0. 35. N. Lat. 48. 18.

MAIGNAN, Emanuel, a religious Minim, and a philoſopher of conſiderable eminence, was born of an ancient and noble family at Thoulouſe in 1601. Like the famous Paſcal, he became a complete mathematician without the aſſiſtance of a teacher; and filled the profeſſor's chair at Rome in 1636, where, at the expence of Cardinal Spada, he publiſhed his book *De Perſpectiva Horaria*. He returned to Thoulouſe in 1650, and was created provincial: the king who in 1660 entertained himſelf with the machines and curioſities in his cell, made him offers by Cardinal Mazarine, to draw him to Paris; but he humbly deſired to ſpend the remainder of his days in a cloiſter. He publiſhed a courſe of philoſophy, 4 vols 8vo, at Thoulouſe; to the ſecond edition of which he added two treatiſes, one againſt the vortices of Deſcartes, and the other on the ſpeaking trumpet invented by Sir Samuel Morland. He is ſaid to have ſtudied even in his ſleep, his very dreams being employed in theorems, the demonſtrations of which would awaken him with joy. He died in 1676.

MAJESTY, a title given to kings, which frequently ſerves as a term of diſtinction. The word ſeems compoſed of the two Latin words, *major* "greater," and *ſtatus* "ſtate." The emperor is called *Sacred Majeſty*, *Imperial Majeſty*, and *Cæſarean Majeſty*: The king of Hungary is ſtyled *His Apoſtolic Majeſty*. The king of Spain is termed *His moſt Catholic Majeſty*: and the king of Portugal, *His moſt Faithful Majeſty*. The king of France uſed to be called *His moſt Chriſtian Majeſty*; and when he treated with the emperor, the word *Sacred* was added: He was afterwards called ſimply, *King of the French*. Bonaparte aſſumed the title of *Emperor and King of France*.—With reſpect to other kings, the name of the kingdom is added; as *His Britannic Majeſty*, *His Pruſſian Majeſty*, &c. Formerly princes were more ſparing in giving titles, and more modeſt in claiming them: before the reign of Charles V. the king of Spain had only the title of *Highneſs*; and before that of Henry VIII. the kings of England were only addreſſed under the titles of *Grace* and *Highneſs*.

Under the Roman republic, the title *Majeſty*, (*majeſtas*) belonged to the whole body of the people, and to the principal magiſtrates; ſo that to diminiſh or wound the majeſty of the commonwealth, was to be wanting in reſpect to the ſtate or to its miniſters. But the power afterwards paſſing into the hands of a ſingle perſon, the appellation of *Majeſty* was transferred to the emperor and the imperial family. Pliny compliments Trajan on his being contented with the title of *Greatneſs*; and ſpeaks very invidiouſly of thoſe who affected that of *Majeſty*. And yet this laſt ſeems to be the moſt modeſt and juſt title that can be attributed to ſovereigns, ſince it ſignifies no more than the royalty or ſovereign power.

MAII INDUCTIO, an ancient cuſtom for the prieſt and people of country-villages to go in proceſſion to ſome adjoining wood on a May-day morning; and return in a kind of triumph, with a May-pole, boughs, flowers, garlands, and other tokens of the ſpring. This May-game, or rejoicing at the coming of the ſpring, was for a long time obſerved, and ſtill is in ſome parts of England; but there was thought to be ſo much heathen vanity in it, that it was condemned and prohibited within the dioceſe of Lincoln by the good old Biſhop Groſthead.

MAIL (*maille*), a term primarily applied to the meſhes or holes in net-work.

Coat of MAIL. See COAT. It is called alſo a *habergeon*. Anciently they alſo wore ſhirts of mail under the waiſtcoat, to ſerve as a defence againſt ſwords and poniards. We alſo read of gloves of mail.

MAIL, or *Mall*, alſo ſignifies a round ring of iron; whence the play of pall-mall, from *palla* "a ball," and *maille* "the round ring through which it is to paſs."

MAIL, or *Maille*, in our old writers, a ſmall kind of money. Silver halfpence were likewiſe termed *Mailles*, 9 Henry V. By indenture in the mint, a pound weight of old ſterling ſilver was to be coined into 360 ſterlings or pennies, or 720 *mails* or half-pennies, or 1440 farthings. Hence the word *mail* was derived, which is now vulgarly uſed in Scotland to ſignify an annual rent.

MAIL, or *Maill*, on ſhip-board, a ſquare machine compoſed of a number of rings interwoven net-wiſe, and uſed for rubbing off the looſe hemp which remains on lines or white cordage after it is made.

MAIL is likewiſe uſed for the leather bag wherein letters are carried by the poſt.

Mail-Coaches. See COACH.

Action of MAILS *and Duties*, in *Scots Law*. See LAW, p. 689, § 20.

MAIL, *Black*. See *Black-Mail*.

MAILLA, JOSEPH-ANNE-MARIE DE MOYRIAC DE, a learned Jeſuit, was born in the caſtle of Maillac in the Bugey, and appointed a miſſionary to China, whither he went in 1703. At the age of 28 he had acquired ſo great a ſkill in the characters, arts, ſciences, mythology, and ancient books of the Chineſe, as to aſtoniſh even the learned. He was greatly beloved and eſteemed by the emperor Kham-Hi, who died in 1722. He, together with other miſſionaries, was employed by that prince to draw a chart of China and Chineſe Tartary, which was engraven in France in the year 1732. He drew likewiſe particular charts of ſome of the provinces of this vaſt empire; with which the emperor was ſo pleaſed, that he ſettled the author at his court. The great annals of China were alſo tranſlated into French by Father Mailla, and his manuſcript was tranſmitted to France in 1737. This work was publiſhed in 12 volumes quarto, under the inſpection of M. Groſier, and is the firſt complete hiſtory of that extenſive empire. The ſtyle, which was full of hyperbole and bombaſt, has been reviſed by the editor, and the ſpeeches which extended to too great a length, and had too much ſameneſs in them, have been omitted. Father Mallia, after having reſided 45 years in China, died at Pekin on the 28th of June 1748, in the 79th year of his age. Kien-Lung the reigning emperor paid the expences of his funeral. He was a man of a lively and gentle character, capable of the moſt perſevering labour and the moſt unremitting activity.

MAILLET, BENOIT DE, deſcended from a noble family in Lorrain, was born in 1659, and appointed, at the age of 33, conſul-general for Egypt. He fulfilled this office for 16 years with great ability, ſupported the king's authority againſt the janizaries, and greatly extended the trade of France into that part of Africa. As a recompenſe for his ſervices, the king beſtowed upon him the conſulſhip of Leghorn, which is the firſt and moſt conſiderable conſulſhip in his gift. Being at laſt appointed in 1715 to viſit the

Maillet ‖ Maim.

ſea ports in the Levant and on the coaſt of Barbary, he was ſo ſucceſsful in the execution of his commiſſion, that he obtained permiſſion to retire with a conſiderable penſion. He ſettled at Marſeilles; where he died in 1738, in the 79th year of his age. He was a man of a lively imagination, and gentle manners; in ſociety he was very amiable, and he poſſeſſed the ſtricteſt probity. He was fond of praiſe, and very anxious about the reputation of genius. During the whole of his life he paid particular attention to the ſtudy of natural hiſtory: and his principal object was to become acquainted with the origin of our globe. On this important ſubject he left ſome curious obſervations, which have been publiſhed in octavo under the title of *Telliamed*, which is the name *de Maillet* written backwards. The editor Abbé Maſcrier has given to this work the form of dialogue. An Indian philoſopher is introduced as explaining to a French miſſionary his opinion concerning the nature of the globe, and the origin of mankind; and, which is very incredible, he ſuppoſes it to have come out of the waters, and makes an abode uninhabitable by man the birthplace of the human race. His great object is to prove, that all the ſtrata of which this globe is compoſed, even to the tops of the higheſt mountains, have come from the boſom of the waters; that they are the work of the ſea, which continually retires to allow them gradually to appear. Telliamed dedicated his book to the illuſtrious Cyrano de Bergerac, author of the imaginary "Travels to the ſun and moon." In the humorous epiſtle which is addreſſed to him, the Indian philoſopher informs us that theſe dialogues are nothing but a collection of dreams and fancies. He cannot be accuſed of having broken his word; but he may well be reproached with not having written them in the ſame ſtyle with his letter to Cyrano, and with not having diſplayed equal livelineſs and humour. A ſubject the moſt extravagant is handled in the graveſt manner, and his ridiculous opinion is delivered with all the ſerious air of a philoſopher. Of the ſix dialogues which compoſe the work, the four firſt contain many curious obſervations truly philoſophical and important: in the other two we find nothing but conjectures, fancies, and fables, ſometimes amuſing, but always abſurd. To Maillet we are indebted alſo for "A Deſcription of Egypt," collected from his memoirs by the editor of Telliamed, 1743, 4to, or in 2 vols. 12mo.

MAIM, Maihem, or *Mayhem*, in *law*, a wound by which a perſon loſes the uſe of a member that might have been a defence to him; as when a bone is broken, a foot, hand, or other member cut off, or an eye put out; though the cutting off an ear or noſe, or breaking the hinder-teeth, was formerly held to be no maim. A maim by caſtration was anciently puniſhed with death, and other maims with loſs of member for member; but afterwards they were only puniſhed by fine and impriſonment. It is now enacted by the ſtatute 22 and 23 Car. II. that if any perſon, from malice aforethought, ſhall diſable any limb or member of any of the king's ſubjects with an intent to disfigure him, the offender, with his aiders and abettors, ſhall be guilty of felony without benefit of clergy; though no ſuch attainder ſhall corrupt the blood, or occaſion forfeiture of lands, &c.

Maimonides ‖ Mainprize.

MAIMONIDES, Moses, or Moses the son of Maimon, a celebrated rabbi, called by the Jews *the eagle of the doctors*, was born of an illuſtrious family at Cordova in Spain, in 1131. The early part of his education was undertaken by his father, who afterwards placed him under the tuition of Rabbi Joſeph, the ſon of Megas, a perſon on whoſe profound learning he has beſtowed the higheſt praiſe; and, according to Leo Africanus, he had alſo among his tutors the learned Arabians Ibn Thophail and Averroes. He is commonly named *Moſes Ægyptius*, becauſe he ſettled in Egypt, where he ſpent his whole life in quality of phyſician to the ſultan. Here he opened a ſchool, which was ſoon filled with pupils from all parts, from Alexandria and Damaſcus eſpecially, whoſe proficiency under him ſpread his fame all over the world. He was no leſs eminent in philoſophy, mathematics, and divinity, than in medicine. Caſaubon affirms it may be truly ſaid of him, as Pliny of old ſaid of Diodorus Siculus, that "he was the firſt of his tribe who ceaſed to be a trifler." It would be tedious to enumerate all the works of Maimonides; ſome were written originally in Arabic, but are now extant only in Hebrew tranſlations. "Thoſe (ſays Collier) who deſire to learn the doctrine and the canon law contained in the Talmud, may read Maimonides's compendium of it in good Hebrew, in his book entitled *Iad;* wherein they will find great part of the fables and impertinencies in the Talmud entirely diſcarded. But the *More Nevochim* is the moſt valued of all his works; deſigned to explain the obſcure words, phraſes, metaphors, &c. in ſcripture, which, when literally interpreted, have either no meaning or appear abſurd.

MAIN, an epithet uſually applied by ſailors to whatever is principal, as oppoſed to whatever is inferior or ſecondary. Thus the main land is uſed in contradiſtinction to an iſland or peninſula; and the main maſt, the main wale, the main keel, and the main hatchway, are in like manner diſtinguiſhed from the fore and mizen maſts, the channel wales, the falſe keel, and the fore and after hatchways, &c.

MAINOUR, Manour, or *Meinour* (from the French, *manier*, i. e. *manu tractare*), in a legal ſenſe denotes the thing that a thief taketh away or ſtealeth: As to be taken with the mainour (*Pl. Cor.* fol. 179.), is to be taken with the thing ſtolen about him: And again (fol. 194.) it was preſented, that a thief was delivered to the ſheriff or viſcount, together with the mainour: And again (fol. 186.), if a man be indicted, that he feloniouſly ſtole the goods of another, where, in truth, they are his own goods, and the goods be brought into the court as the mainour; and if it be demanded of him, what he ſaith to the goods, and he diſclaim them; though he be acquitted of the felony, he ſhall loſe the goods: And again (fol. 149.), if the defendant were taken with the mainour, and the mainour be carried to the court, they, in ancient times, would arraign him upon the mainour, without any appeal or indictment. Cowel. See *Blackſt. Comment.* vol. iii. p. 71. vol. iv. p. 303.

MAINPRIZE. See *Falſe Imprisonment.*

The writ of mainprize, *manucaptio*, is a writ directed to the ſheriff (either generally, when any man is impriſoned for a bailable offence, and bail hath been refuſed; or ſpecially, when the offence or cauſe of commitment

Mainte-nance. Maintenon.

commitment is not properly bailable below), commanding him to take ſureties for the priſoner's appearance, uſually called *mainpernors*, and to ſet him at large. Mainpernors differ from bail, in that a man's bail may impriſon or ſurrender him up before the ſtipulated day of appearance; mainpernors can do neither, but are barely ſureties for his appearance at the day: bail are only ſureties that the parties be anſwerable for the ſpecial matter for which they ſtipulate, mainpernors are bound to produce him to anſwer all charges whatever. See *Habeas Corpus*.

MAINTENANCE, in *Law*, bears a near relation to Barretry; being an officious intermeddling in a ſuit that no way belongs to one, by maintaining or aſſiſting either party with money or otherwiſe, to proſecute or defend it: a practice that was greatly encouraged by the firſt introduction of uſes. This is an offence againſt public juſtice, as it keeps alive ſtrife and contention, and perverts the remedial proceſs of the law into an engine of oppreſſion. And therefore, by the Roman law, it was a ſpecies of the *crimen falſi*, to enter into any confederacy, or do any act to ſupport another's law ſuit, by money, witneſſes, or patronage. A man may, however, maintain the ſuit of his near kinſman, ſervant, or poor neighbour, out of charity and compaſſion, with impunity. Otherwiſe the puniſhment by common law is fine and impriſonment; and by the ſtatute 32 Henry VIII. c. 9. a forfeiture of 10l.

MAINTENON, Madame de, a French lady of extraordinary fortune, deſcended from an ancient family, and whoſe proper name was *Frances d'Aubigné*, was born in 1635. Her parents by misfortunes being ill able to ſupport her, ſhe fell to the care of her mother's relations; to eſcape which ſtate of dependence, ſhe was induced to marry that famous old buffoon the Abbé Scarron, who ſubſiſted himſelf only on a penſion allowed him by the court for his wit and parts. She lived with him many years, which Voltaire makes no ſcruple to call the happieſt years of her life; but when he died in 1660, ſhe found herſelf as indigent as ſhe had been before her marriage. Her friends indeed endeavoured to get her huſband's penſion continued to her, and preſented ſo many petitions to the king about it, all beginning with "The widow Scarron moſt humbly prays your majeſty's," &c. that he was quite weary of them, and has been heard to exclaim, "Muſt I always be peſtered with the widow Scarron?" At laſt, however, through the recommendation of Madame de Monteſpan, he ſettled a much larger penſion on her, with a genteel apology for making her wait ſo long; and afterward made choice of her to take care of the education of the young duke of Maine, his ſon by Madame de Monteſpan. The letters ſhe wrote on this occaſion charmed the king, and were the origin of her advancement; her perſonal merit effected all the reſt. He bought her the lands of Maintenon, the only eſtate ſhe ever had: and finding her pleaſed with the acquiſition, called her publicly *Madame de Maintenon*; which was of great ſervice to her in her good fortune, by releaſing her from the ridicule attending that of Scarron. Her elevation was to her only a retreat: the king came to her apartment every day after dinner, before and after ſupper, and continued there till midnight: here he did buſineſs with his miniſters, while Madame de Maintenon, employed in reading or needle-work, never ſhewed any deſire to talk of ſtate affairs, and carefully avoided all appearance of cabal or intrigue; ſhe did not even make uſe of her power to dignify her own relations. About the latter end of the year 1685, Louis XIV. married her, he being then in his 48th and ſhe in her 50th year; and that piety with which ſhe inſpired the king to make her a wife inſtead of a miſtreſs, became by degrees a ſettled diſpoſition of mind. She prevailed on Louis to found a religious community at St Cyr, for the education of 300 young ladies of quality; and here ſhe frequently retired from that melancholy of which ſhe complains ſo pathetically in one of her letters, and which few ladies will ſuppoſe ſhe ſhould be liable to in ſuch an elevated ſituation. But, as M. Voltaire ſays, if any thing could ſhow the vanity of ambition, it would certainly be this letter. Madame de Maintenon could have no other uneaſineſs than the uniformity of her manner of living with a great king; and this made her once ſay to the count D'Aubigné her brother, "I can hold it no longer; I wiſh I was dead." The anſwer he made to her was, "You have then a promiſe to marry the Almighty!" Louis, however, died before her in 1715; when ſhe retired wholly to St Cyr, and ſpent the reſt of her days in acts of devotion; and what is moſt ſurpriſing is, that her huſband left no certain proviſion for her, recommending her only to the duke of Orleans. She would accept no more than a penſion of 80,000 livres, which was punctually paid her till ſhe died in 1719. A collection of her letters has been publiſhed, and tranſlated into Engliſh; from which familiar intercourſes her character will be better known than from deſcription.

MAJOR, in the art of war, the name of ſeveral officers of very different ranks and functions.

Major general. See General.

Major of a Regiment of Foot, the next officer to the lieutenant-colonel, generally promoted from the eldeſt captain: he is to take care that the regiment be well exerciſed, to ſee it march in good order, and to rally it in caſe of being broke in action: he is the only officer among the infantry that is allowed to be on horſeback in time of action, that he may the more readily execute the colonel's orders.

Major of a Regiment of Horſe, as well as foot, ought to be a man of honour, integrity, underſtanding, courage, activity, experience, and addreſs: he ſhould be maſter of arithmetic, and keep a detail of the regiment in every particular: he ſhould be ſkilled in horſemanſhip, and ever attentive to his buſineſs: one of his principal functions is, to keep an exact roſter of the officers for duty: he ſhould have a perfect knowledge in all the military evolutions, as he is obliged by his poſt to inſtruct others, &c.

Town-Major, the third officer in order in a garriſon, and next to the deputy-governor. He ſhould underſtand fortification, and has a particular charge of the guards, rounds, patroles, and centinels

Brigade Major, is a particular officer appointed for that purpoſe only in camp. He goes every day to head-quarters to receive orders from the adjutant-general: there he writes exactly whatever is dictated to him; from thence he goes and gives the orders, at the place appointed for that purpoſe, to the different majors of adjutants of the regiments which compoſe that brigade, and regulates with them the number of officers and men which each are to furniſh for the duty of the army; taking care to keep an exact roſter, that one may not give more than another; and that each march in their tour: in ſhort, the major of brigade is charged with the particular detail in his own brigade, in much the ſame way as the adjutant general is charged with the general detail of the duty of the army. He ſends every morning to the adjutant-general an exact return, by battalion and company, of the men of his brigade miſſing at the retreat, or a report expreſſing that none are abſent: he alſo mentions the officers abſent with or without leave.

As all orders paſs through the hands of the majors of brigade, they have infinite occaſions of making known their talents and exactneſs.

Major of Artillery, is alſo the next officer to the lieutenant-colonel. His poſt is very laborious, as the whole detail of the corps particularly reſts with him; and for this reaſon all the non-commiſſioned officers are ſubordinate to him, as his title of *ſerjeant-major* imports: in this quality they muſt render him an exact account of every thing which comes to their knowledge, either regarding the duty or wants of the artillery and ſoldiers. He ſhould poſſeſs a perfect knowledge of the power of artillery, together with all its evolutions. In the field he goes daily to receive orders from the brigade-major, and communicates them with the parole to his ſuperiors, and then dictates them to the adjutant. He ſhould be a very good mathematician, and be well acquainted with every thing belonging to the train of artillery, &c.

Major of Engineers, commonly with us called *Subdirector*, ſhould be very well ſkilled in military architecture, fortification, gunnery, and mining. He ſhould know how to fortify in the field, to attack and defend all ſorts of poſts, and to conduct the works in a ſiege, &c. See Engineer.

Aid-Major, is on ſundry occaſions appointed to act as major, who has a pre-eminence above others of the ſame denomination. Our horſe and foot guards have their guidons, or ſecond or third majors.

Serjeant-Major, is a non-commiſſioned officer, of great merit and capacity, ſubordinate to the adjutant as he is to the major. See Serjeant.

Drum Major, is not only the firſt drummer in the regiment, but has the ſame authority over his drummers as the corporal has over his ſquad. He inſtructs them in their different beats; is daily at orders with the ſerjeants, to know the number of drummers for duty. He marches at their head when they beat in a body. In the day of battle, or at exerciſe, he muſt be very attentive to the orders given him, that he may regulate his beats according to the movements ordered.

Fife-Major, is he that plays the beſt on that inſtrument, and has the ſame authority over the fifers as the drum-major has over the drummers. He teaches them their duty, and appoints them for guards, &c.

Major, in *Law*, a perſon who is of age to manage his own affairs. By the civil law a man is not a major till the age of 25 years; in England, he is a major at 21, as in Normandy at 20.

Major, in *Logic*, is underſtood of the firſt propoſition of a regular ſyllogiſm. It is called *major*, becauſe it has a more extenſive ſenſe than the minor propoſition, as containing the principal term. See Logic.

Major and *Minor*, in *Muſic*, are applied to concords which differ from each other by a ſemi-tone. See Concord.

Major tone is the difference between the fifth and fourth; and major ſemi-tone the difference between the major fourth and the third. The major tone ſurpaſſes the minor by a comma.

Major-Domo, an Italian term, frequently uſed to ſignify a ſteward or maſter of the houſehold. The title of *major-domo* was formerly given in the courts of princes to three different kinds of officers. 1. To him who took care of what related to the prince's table, or eating; otherwiſe called *eleater*, *præfectus menſæ*, *architriclinus*, *dapifer*, and *princeps coquorum*.—2. Major-domo was alſo applied to the ſteward of the houſehold.—3. The title of major-domo was alſo given to the chief miniſter, or him to whom the prince deputed the adminiſtration of his affairs, foreign and domeſtic, relating to war as well as peace. Inſtances of major domos in the two firſt ſenſes are frequent in the Engliſh, French, and Norman affairs.

Major, *John*, a ſcholaſtic divine and hiſtorian, was born at Haddington, in the province of Eaſt Lothian in Scotland. It appears from ſome paſſages in his writings, that he reſided a while both at Oxford and Cambridge. He went to Paris in 1493, and ſtudied in the college of St Barbe, under the famous John Boulac. Thence he removed to that of Montacute, where he began to ſtudy divinity under the celebrated Standouk. In the year 1498, he was entered of the college of Navarre. In 1505, he was created doctor in divinity; returned to Scotland in 1519, and taught theology during ſeveral years in the univerſity of St Andrew's. But, at length, being diſguſted with the quarrels of his countrymen, he went back to Paris, and reſumed his lectures in the college of Montacute, where he had ſeveral pupils who afterwards became men of great eminence. About the year 1530, he returned once more to Scotland, and was choſen profeſſor of theology at St Andrew's, of which he afterwards became provoſt; and there died in 1547, aged 78. His logical treatiſes form one immenſe folio; his commentary on Ariſtotle's phyſics makes another; and his theological works amount to ſeveral volumes of the ſame ſize. Theſe maſſes of crude and uſeleſs diſquiſition were the admiration of his contemporaries. A work, leſs prized in his own age, was to make him known to poſterity. His book *De Geſtis Scotorum*, was firſt publiſhed at Paris by Badius Aſcenſius, in the year 1521. He rejects in it ſome of the fictions of former hiſtorians; and would have had greater merit if he had rejected more. He intermingles the hiſtory of England with that of Scotland; and has incurred the cenſure of ſome partial writers, for giving an authority to the authors of the former nation, which he refuſes to thoſe of his own. Bede, Caxton, and Froiſſard, were exceedingly uſeful to him. What does the greateſt honour to this author is, the freedom with which he has cenſured the rapacity and indolence of eccleſiaſtics, and the ſtrain of ridicule with which he treats the pope's ſupremacy. The ſtyle in which he wrote does not deſerve commendation. Biſhop Spotiſwood calls it *Sorbonnic* and *barbarous*.

Majorca, Mairan.

MAJORCA, an iſland of the Mediterranean, lying between Yvica on the weſt and Minorca on the eaſt. Theſe three iſlands were anciently called *Baleares*, ſuppoſed to be from the ſkill of their inhabitants in ſlinging, for which they were very remarkable. Originally they belonged to the Carthaginians; but during the wars of that people with the Romans they ſeem to have regained their liberty. In 122 B. C. they were ſubdued by Metellus the Roman conſul, who treated the inhabitants with ſuch cruelty, that out of 30,000 he ſcarce left 1000 alive. He then built two cities on Majorca; one called *Palma*, now *Majorca*, to the eaſt; the other to the weſt, named *Pollentia*, now no longer in being. The iſland continued ſubject to the Romans, and to the nations who overran the weſtern part of the empire, for many ages. At laſt it was ſubdued by the Moors about the year 800. By them the iſland was put in a much better condition than it ever was before or ſince. The Moors being very induſtrious, and alſo populous, ſurrounded the whole coaſt with fortifications, that is, with a kind of towers and lines between them; cultivated every ſpot in the iſland that was not either rock or ſand; and had no fewer than 15 great towns, whereas now there are not above three. Neither was it at all difficult for the Mooriſh monarch to bring into the field an army much ſuperior in number to the inhabitants that are now upon it, taking in all ranks, ſexes, and ages. In 1229, the iſland was ſubdued by the king of Arragon, who eſtabliſhed in it a new kingdom, feudatory to that of Arragon, which was again deſtroyed in 1341 by the ſame monarchs; and ever ſince, the iſland hath been ſubject to Spain, and hath entirely loſt its importance. It is about 60 miles long, and 45 broad. The air is clear and temperate; and, by its ſituation, the heat in ſummer is ſo qualified by the breezes, that it is by far the moſt pleaſant of all the iſlands in the Mediterranean. There are ſome mountains; but the country is generally flat, and of ſuch an excellent ſoil, that it produces great quantities of corn as good in its kind as any in Europe. Oil, wine, and ſalt, are very plentiful, as alſo black cattle and ſheep; but deer, rabbits, and wildfowl, abound ſo much, that they alone are ſufficient for the ſubſiſtence of the inhabitants. There are no rivers, but a great many ſprings and wells, as well as ſeveral good harbours. The inhabitants are robuſt, active, and good ſeamen.

Majorca, a handſome, large, rich, and ſtrong town, in the iſland of the ſame name, with a biſhop's ſee. It contains about 6000 houſes, and 22 churches, beſides the cathedral. The ſquares, the cathedral, and the royal palace, are magnificent ſtructures. A captain-general reſides there, who commands the whole iſland; and there is a garriſon againſt the incurſion of the Moors. It was taken by the Engliſh in 1706; but was retaken in 1715, ſince which time it has been in the hands of the Spaniards. It is ſeated on the ſouth-weſt part of the iſland, where there is a good harbour, 70 miles north-eaſt of Yvica, 120 ſouth-eaſt of Barcelona, 140 eaſt of Valencia, and 300 from Madrid. E. Long. 2. 55. N. Lat. 39. 36.

MAIRAN, Jean-Jacques d'Ortous de, deſcended from a noble family at Beſiers, was born in that city in 1678, and died at Paris of a defluxion on the lungs on the 20th of February 1771, at the age of 93. He was one of the moſt illuſtrious members of the Academy of Sciences and of the French Academy. Being early connected with the former ſociety, he, in the year 1741, ſucceeded Fontenelle in the office of ſecretary. This ſtation he filled with the moſt diſtinguiſhed ſucceſs till the year 1744; and, like his predeceſſor, poſſeſſed the faculty of placing the moſt abſtract ſubjects in the cleareſt light; a talent which is very rare, but which appears conſpicuous in all his works. The chief of them are, 1. *Diſſertation ſur la Glace*, the laſt edition of which was printed in 1749, 12mo. This excellent little tract has been tranſlated into German and Italian. 2. *Diſſertation ſur la cauſe de la lumiere des Phoſphores*, 1717, 12mo. 3. *Traité hiſtorique et phyſique de l'Aurore Boreale*, firſt publiſhed in 12mo, 1733, and afterwards much enlarged and printed in 4to in 1754. The ſyſtem embraced by the author is liable to be controverted; but the book diſplays great taſte and erudition. 4 *Lettre au Pere Parennin, contenant diverſes queſtions ſur la Chine*, 12mo. This is a very curious work, and is full of that philoſophical ſpirit which characterizes the author's other publications. 5. A great number of papers in the memoirs of the Academy of Sciences (ſince 1719), of which he publiſhed ſome volumes. 6. Several Diſſertations on particular ſubjects, which form only ſmall pamphlets. 7. The *Eloges* of the Academicians of the Academy of Sciences, who died in 1741, 1742, 1743, in 12mo, 1747. Without imitating Fontenelle, the author attained almoſt equal excellence by his talent of diſcriminating characters, appreciating their worth, and giving them their due ſhare of praiſe, without at the ſame time concealing their defects.

Mairan's reputation extended itſelf into foreign countries. He was a member of the Imperial Academy at Peterſburgh, of the Royal Academy of London, of the inſtitution at Bologna, of the royal ſocieties of Edinburgh and Upſal, &c. The gentleneſs and ſweetneſs of his manners made him be conſidered as a perfect model of the ſocial virtues. He poſſeſſed that amiable politeneſs, that agreeable gaiety, and that ſteady firmneſs, which never fail to procure love and eſteem. But we muſt add, ſays M. Saverien, that every thing had a reference to himſelf; ſelf-love and a regard to his own reputation were the motives of all his actions. He was deeply affected with cenſure or applauſe, and yet he had many friends. Uniting much gentleneſs of diſpoſition to an ingenious and agreeable expreſſion of countenance, he poſſeſſed the art of inſinuating himſelf into the good graces of others, ſo as to pave the way to elevation and ſucceſs. He was honoured with protection and particular marks of regard by the duke of Orleans the regent, who bequeathed to him his watch in his will. The prince of Conti loaded him with favours; and the chancellor Dagueſſeau, obſerving in him great originality and ingenuity of thought, appointed him preſident of the *Journal des Sçavans*: a ſtation which he filled very much to the ſatisfaction of the public and of the learned. The private and ſelfiſh views imputed to him by M. Saverien never made him deficient in what was due to the ſtricteſt probity. An expreſſion of his is remembered, which could have proceeded only from ſentiment; "An honeſt man (ſaid he) is one whoſe blood is refreſhed with the recital of a good action."

He was ready at repartee. One day he happened to be in company with a gentleman of the gown, and to differ with him in opinion upon ſome point which had no more connexion with juriſprudence than with geometry. "Sir (ſaid the magiſtrate, who ſuppoſed that a learned man was a perfect idiot out of his own ſphere), we are not now talking of Euclid or Archimedes."—"No, nor of Cujas nor Barthole!" replied the academician.

MAIRE, Streights le, a paſſage to Cape Horn, ſituated between Terra del Fuego and Staten iſland; which, being diſcovered by Le Maire, obtained his name. It is now, however, leſs made uſe of than formerly, ſhips going round Staten iſland as well as Terra del Fuego.

MAISTRE, Louis-Isaac le, better known by the name of *Sacy*, was born at Paris in 1613. His genius very early diſcovered itſelf. After an excellent courſe of ſtudy under the direction of the abbot of Saint Cyran, he was raiſed to the prieſthood in 1648, and ſoon after was choſen, on account of his virtues, to be director of the religious of Port Royal des Champs. As this monaſtery bore the reputation of Janſeniſm, their enemies were furniſhed with a pretence for perſecuting them. In 1661 the director was obliged to conceal himſelf; and in 1666 he was committed to the Baſtile. During his confinement he compoſed the book *Figures de la Bible*; in which, according to the Moliniſts, alluſions are made to the ſufferings endured by the Janſeniſts. If we may believe a Jeſuit writer, the gentlemen of Port Royal and thoſe who oppoſed their errors are repreſented in the 92d figure, the former by David, the latter by Saul. Rehoboam in the 116th figure, Jezebel in the 130th, Ahaſuerus in the 148th and 150th, and Darius in the 160th, in the opinion of this author, repreſent Louis XIV. The writer of theſe anecdotes, of which we do not anſwer for the authenticity, adds, that when Sacy wiſhed to reproach his perſecutors, he always did it by means of the holy fathers. If this is the key to thoſe enigmatical portraits and alluſions, which it is pretended are to be found in that book, certain we are it was not diſcovered by the ſpirit of charity. Beſides, it is not certain that Sacy was the author of that book; for it is much more probable that it was compoſed by Nicolas Fontaine his fellow priſoner.

To Sacy's confinement the public are indebted for a French tranſlation of the Bible. This work was finiſhed in 1668, the evening before the feaſt of All Saints; on which day he recovered his liberty, after an impriſonment of two years and a half. He was preſented to the king and the miniſter; and all the favour he aſked from them was, that they would ſend ſeveral times a year to examine the ſtate of the priſoners in the Baſtile. Le Maiſtre continued at Paris till 1675, when he retired to Port Royal, which he was obliged to leave in 1679. He went to ſettle at Pompone, where he died January 4. 1684, at the age of 71. From him we have, 1. *La Traduction de la Bible*, with explanations of the ſpiritual and literal meaning taken from the fathers, the greater part of which was done by Du Foſſé, Huré, and Tourneux. This is the beſt French tranſlation which has yet appeared, and the moſt eſteemed edition is that of Paris in 32 volumes 8vo, 1682 and following years. The author tranſlated the New Teſtament three times, becauſe the firſt time the ſtyle of it appeared too much laboured and too refined, and the ſecond too ſimple. A counterfeit of the edition in 32 vols. 8vo, was publiſhed at Bruſſels in 40 vols. 12mo. The beſt editions of this verſion have been publiſhed at Bruſſels, 1700, in 3 vols. 4to; at Amſterdam, under the name of *Paris*, 1711, 8. vols 12mo; at Paris 1713, in 2 vols 4to; and in 1715, with notes and a concordance, 4 vols folio. 2. *Une Traduction des Pſeaumes ſelon l'Hebreu et la Vulgate*, in 12mo. 3. *Une verſion des Homelies de St Chryſoſtome ſur St Matthieu*, in 3 vols 8vo. 4. *La Traduction de l'Imitation de Jeſus Chriſt* (*ſous le nom de Beuil, prieur de Saint-Val*), Paris 1663. 8vo. 5. *Celle de Phedre*, 12mo, (*ſous le nom de Saint-Aubin*). 6. *De trois Comédies de Térence*, in 12mo. 7. *Des Lettres de Bongars* (*ſous le nom de Brianville*). 8. *Du Pöeme de St Proſper ſur les ingrates*, 12mo, *en verſe et en proſe*. 9. *Les Enluminures de l'Almanach des Jéſuites*, 1654, 12mo, reprinted in 1733. In 1653 there appeared a print repreſenting the overthrow of Janſeniſm anathematized by the two powers, and the confuſion of the diſciples of the biſhop of Ypres, who are going to ſeek refuge with the Calviniſts. The monks of Port-Royal were greatly provoked at this print, and Sacy thought that he would lower its reputation by means of his *Enluminures*, which Racine has ridiculed in one of his letters. It is indeed very ſtrange that men of taſte and piety ſhould write ſatires to the injury of one another. 10. *Heures de Port-Royal*, 12mo. 11. *Lettres de Piété*, Paris 1690, 2 vols. 8vo.

MAITTAIRE, Michael, a learned Engliſh writer, was born in 1668. Dr South, canon of Chriſt-Church, made him a ſtudent of that houſe, where he took the degree of M. A. March 23. 1696. From 1695 till 1699 he was ſecond maſter of Weſtminſter ſchool; which was afterwards indebted to him for *Græcæ Linguæ Dialecti, in uſum Scholæ Weſtmonaſterienſis*, 1706, 8vo; and for "The Engliſh Grammar, applied to, and exemplified in, the Engliſh Tongue, 1712," 8vo. In 1711, he publiſhed "Remarks on Mr Whiſton's Account of the Convocation's proceedings with relation to himſelf, in a Letter to the right reverend Father in God George Lord Biſhop of Bath and Well's," 8vo; alſo "An Eſſay againſt Arianiſm, and ſome other Hereſies; or a Reply to Mr William Whiſton's Hiſtorical Preface and Appendix to his Primitive Chriſtianity revived," 8vo. In 1709 he gave the firſt ſpecimen of his great ſkill in typographical antiquities, by publiſhing *Stephanorum Hiſtoria, vitas ipſorum ac libros complectens*, 8vo; which was followed in 1717 by *Hiſtoria Typographorum aliquot Pariſienſium, vitas et libros complectens*, 8vo. In 1719, *Annales Typographici ab artis inventæ origine ad annum MD*, 4to. The ſecond volume, divided into two parts, and continued to the year 1536, was publiſhed at the Hague in 1702; introduced by a letter of John Toland, under the title of *Conjectura veriſimilis de prima Typographiæ Inventione*. The third volume, from the ſame preſs, in two parts, continued to 1557, and (by an Appendix) to 1664, in 1725. In 1733 was publiſhed at Amſterdam what is uſually conſidered as the fourth volume, under the title of *Annales Typographici ab artis inventæ origine, ad annum MDCLXIV, opera Mich. Maittaire, A. M. editio nova, auctior et emendatior*, *tomi*

Maittaire. *tomi primi pars poſterior* (A.) In 1741 the work was cloſed at London, by *Annalium Typographicorum Tomus quintus et ultimus, indicem in tomos quatuor præeuntes complectens*; divided, like the two preceding volumes, into two parts. In the intermediate years, Mr Maittaire was diligently employed on various works of value. In 1713 he publiſhed by ſubſcription *Opera et Fragmenta Veterum Poëtarum*, 1713, two volumes in folio: the title of ſome copies is dated 1721. In 1714, he was the editor of a Greek Teſtament, in 2 vols. The Latin writers, which he publiſhed ſeparately, moſt of them with good indexes, came out in the following order: In 1713, *Chriſtus Patiens*; *Juſtin*; *Lucretius*; *Phædrus*; *Salluſt*; *Terence*. In 1715, *Catullus*; *Tibullus*; *Propertius*; *Cornelius Nepos*; *Florus*; *Horace*; *Juvenal*; *Ovid*, 3 vols; *Virgil*. In 1711, *Cæſar's Commentaries*; *Martial*; *Quintus Curtius*. In 1718 and 1725, *Velleius Paterculus*, In 1719, *Lucan*. In 1720, *Bonefonii Carmina*. In 1721 he publiſhed, *Batrachomyomachia, Græcè, ad veterum exemplarium fidem recuſa; gloſſa Græca, variantibus lectionibus, verſionibus Latinis, commentariis et indicibus, illuſtrata*, 8vo. In 1722, *Miſcellanea Græcorum aliquot Scriptorum Carmina, cum verſione Latina et notis*, 4to. In 1724 he compiled, at the requeſt of Dr John Freind (at whoſe expence it was printed), an index to the works of *Aretæus*, to accompany the ſplendid folio edition of that author in 1723. In 1725 he publiſhed an excellent edition of *Anacreon* in 4to, of which no more than 100 copies were printed, and the few errata in each copy corrected by his own hand. A ſecond edition of the like number was printed in 1741, with ſix copies on fine writing paper. In 1726 he publiſhed *Petri Petiti Medici Pariſienſis in tres priores Aretæi Cappadocis Libros Commentarii, nunc primum editi*, 4to. This learned commentary was found among the papers of Grævius. From 1728 to 1733 he was employed in publiſhing *Marmorum Arundellianorum, Seldenianorum, aliorumque Academiæ Oxonienſi donatorum, una cum Commentariis et Indice, editio ſecunda*, folio; to which an Appendix was printed in 1733. *Epiſtola D. Mich. Maittaire ad D. P. Des Maizeaux, in qua Indicis in Annales Typographicos methodus explicatur*, &c. is printed in "The Preſent State of the Republic of Letters," Auguſt 1733, p. 142. The life of Robert Stephens in Latin, reviſed and corrected by the author, with a new and complete liſt of his works, is prefixed to the improved edition of R. Stephens's Theſaurus, 4 vols in folio, in 1734. In 1736 appeared *Antiquæ Inſcriptiones duæ*, folio; being a commentary on two large copper tables diſcovered near Heraclea, in the bay of Tarentum. In 1738 were printed at the Hague *Græcæ Linguæ Dialecti in Scholæ Regiæ Weſtmonaſterienſis uſum recognitæ opera Mich. Maittaire*. In 1739 he addreſſed to the empreſs of Ruſſia a ſmall Latin poem, under the title of *Carmen Epinicium Auguſtiſſimæ Ruſſorum Imperatrici ſacrum*. His name not having been printed in the title page, it is not ſo generally known that he was editor of Plutarch's *Apophthegmata*, 1741, 4to. The laſt publication of Mr Maittaire was a volume of poems in 4to, 1742, under the title of *Senilia, ſive Poetica aliquot in argumentis varii generis tentamina*. Mr Maittaire died in 1747, aged 79. His valuable library, which had been 50 years collecting, was ſold by auction by Meſſrs Cock and Langford, at the cloſe of the ſame year, and the beginning of the following, taking up in all 44 nights. Mr Maittaire, it may be added, was patronized by the firſt earl of Oxford, both before and after that gentleman's elevation to the peerage, and continued a favourite with his ſon the ſecond earl. He was alſo Latin tutor to Mr Stanhope, the earl of Cheſterfield's favourite ſon.

MAIZE, or *Indian Corn*. See ZEA, BOTANY *Index*.

MAKI. See LEMUR, MAMMALIA *Index*.

MALABAR, the name given to a great part of the weſt coaſt of the peninſula of Hindoſtan on this ſide of the Ganges, extending from the kingdom of Baglala to Cape Comorin, or from the north extremity of the kingdom of Canara as far as Cape Comorin, and lying between 9° and 14° N. Lat. It is bounded by the mountains of Balagate on the eaſt; by Deccan on the north; and on the weſt and ſouth is waſhed by the Indian ſea.

MALACA, in *Ancient Geography*, ſurnamed *Fœderatorum* by Pliny; a maritime town of Bœtica: a Carthaginian colony according to Strabo; ſo called from *Malach*, ſignifying "ſalt;" a place noted for pickled or ſalted meat. Now *Malaga*, a port town of Granada in Spain. W. Long. 4. 45. N. Lat. 36. 40.

MALACCA, the moſt ſoutherly part of the great peninſula beyond the Ganges, is about 600 miles in length, and contains a kingdom of the ſame name. It is bounded by the kingdom of Siam on the north; by the bay of Siam and the Indian ocean on the eaſt; and by the ſtraits of Malacca, which ſeparate it from the iſland of Sumatra, on the ſouth weſt. This country is more to the ſouth than any other in the Eaſt Indies; and comprehends the towns and kingdoms of Patan, Pahan, Igohor, Pera, Queda, Borkelon, Ligor; and to the north the town and kingdom of Tanaſſery, where the Portugueſe formerly carried on a great trade. This laſt either does or did belong to the king of Siam. The people of Malacca are in general ſubject to the Dutch, who poſſeſs all the ſtrong places on the coaſt, and compel them to trade on their own terms, excluding all other nations of Europe from having any commerce with the natives.

The Malays are governed by feudal laws. A chief, who has the title of *king* or *ſultan*, iſſues his commands to his great vaſſals, who have other vaſſals in ſubjection to them in a ſimilar manner. A ſmall part of the nation live independent, under the title of *oranicai* or *no-*

(A) The awkwardneſs of this title has induced many collectors to diſpoſe of their firſt volume, as thinking it ſuperſeded by the ſecond edition: but this is by no means the caſe; the volume of 1719 being equally neceſſary to complete the ſet as that of 1733, which is a reviſion of all the former volumes. The whole work when properly bound, conſiſts, *ad libitum*, either of five volumes or of nine *ſle*, and ſell their ſervices to thoſe who pay them beſt; while the body of the nation is compoſed of ſlaves, and live in perpetual ſervitude.

The generality of theſe people are reſtleſs, fond of navigation, war, plunder, emigration, colonies, deſperate enterpriſes, adventures, and gallantry. They talk inceſſantly of their honour and their bravery; whilſt they are univerſally conſidered by thoſe with whom they have intercourſe, as the moſt treacherous, ferocious people on earth. This ferocity, which the Malays qualify under the name of *courage*, is ſo well known to the European companies who have ſettlements in the Indies, that they have univerſally agreed in prohibiting the captains of their ſhips who may put into the Malay iſlands, from taking on board any ſeamen from that nation, except in the greateſt diſtreſs, and then on no account to exceed two or three. It is not in the leaſt uncommon for an handful of theſe horrid ſavages ſuddenly to embark, attack a veſſel by ſurpriſe, maſſacre the people, and make themſelves maſters of her. Malay batteaux, with 24 or 30 men, have been known to board European ſhips of 30 or 40 guns, in order to take poſſeſſion of them, and murder with their poniards great part of the crew. Thoſe who are not ſlaves go always armed: they would think themſelves diſgraced if they went abroad without their poniards, which they call *crit*. As their lives are a perpetual round of agitation and tumult, they cannot endure the long flowing garments in uſe among the other Aſiatics. Their habits are exactly adapted to their ſhapes, and loaded with a multitude of buttons, which faſten them cloſe to their bodies.

The country poſſeſſed by the Malays is in general very fertile. It abounds with odoriferous woods, ſuch as the aloes, the ſandal, and caſſia. The ground is covered with flowers of the greateſt fragrance, of which there is a perpetual ſucceſſion throughout the year. There are abundance of mines of the moſt precious metals, ſaid to be richer even than thoſe of Brazil or Peru, and in ſome places are mines of diamonds. The ſea alſo abounds with excellent fiſh, together with ambergriſe, pearls, and thoſe delicate birds-neſts ſo much in requeſt in China, formed in the rocks with the ſpawn of fiſhes and the foam of the ſea, by a ſpecies of ſmall-ſized ſwallow peculiar to thoſe ſeas. Theſe are of ſuch an exquiſite flavour, that the Chineſe for a long time purchaſed them for their weight in gold, and ſtill buy them at an exceſſive price. See *Birds-Neſt*.

Notwithſtanding all this plenty, however, the Malays are miſerable. The culture of the lands, abandoned to ſlaves, is fallen into contempt. Theſe wretched labourers, dragged inceſſantly from their ruſtic employments by their reſtleſs maſters, who delight in war and maritime enterpriſes, have never time or reſolution to give the neceſſary attention to the labouring of their grounds; of conſequence the lands for the moſt part are uncultivated, and produce no kind of grain for the ſubſiſtence of the inhabitants. The ſago tree indeed ſupplies in part the defect of grain. It is a ſpecies of the palm tree, which grows naturally in the woods to the height of about 20 or 30 feet; its circumference being ſometimes from five to ſix. Its ligneous bark is about an inch in thickneſs, and covers a multitude of long fibres, which being interwoven one with another envelope a maſs of a gummy kind of meal. As ſoon as this tree is ripe, a whitiſh duſt, which tranſpires through the pores of the leaves, and adheres to their extremities, indicates that the trees are in a ſtate of maturity. The Malays then cut them down near the root, and divide them into ſeveral ſections, which they ſplit into quarters: they then ſcoop out the maſs of mealy ſubſtance, which is enveloped by and adheres to the fibres; they dilute it in pure water, and then paſs it through a ſtraining bag of fine cloth, in order to ſeparate it from the fibres. When this paſte has loſt part of its moiſture by evaporation, the Malays throw it into a kind of earthen veſſel of different ſhapes, where they allow it to dry and harden. This paſte is wholeſome nouriſhing food, and preſerves for many years.

Malacca, the capital of the country of the ſame name, is ſituated in a flat country cloſe to the ſea. The walls and fortifications are founded on a ſolid rock, and are carried up to a great height; the lower part of them is waſhed by the ſea at every tide, and on the landſide is a wide canal or ditch, cut from the ſea to the river, which makes it an iſland. In 1641 it was taken from the Portugueſe by the Dutch, ſince which time it has continued in their poſſeſſion. In this city there are a great many broad ſtreets; but they are very badly paved. The houſes are tolerably well built, and ſome of them have gardens behind or on one ſide. The inhabitants conſiſt of a few Dutch, many Malayans, Moors, Chineſe, and other Indians, who are kept in awe by a fortreſs, which is ſeparated from the city by a river, and by good walls and baſtions, as well as by ſtrong gates, and a drawbridge that is on the eaſtern ſide. The city is well ſituated for trade and navigation. E. Long. 102. 2. N. Lat. 2. 12.

MALACHI, or the prophecy of Malachi, a canonical book of the Old Teſtament, and the laſt of the 12 leſſer prophets. Malachi propheſied about 300 years before Chriſt, reproving the Jews for their wickedneſs after their return from Babylon, charging them with rebellion, ſacrilege, adultery, profaneneſs, and infidelity; and condemning the prieſts for being ſcandalouſly careleſs in their miniſtry; at the ſame time not forgetting to encourage the pious few, who, in that corrupt age, maintained their integrity. This prophet diſtinctly points at the Meſſiah, who was ſuddenly to come to his temple, and to be introduced by Elijah the prophet, that is, John the Baptiſt, who came in the ſpirit and power of Elias or Elijah.

MALACIA, in *Medicine*, is a languiſhing diſorder incident to pregnant women, in which they long ſometimes for one kind of food and ſometimes for another, and eat it with extraordinary greedineſs.

MALACOPTERYGEOUS, in *Ichthyology*, an appellation given to fiſhes having the rays of their fins bony at the extremities, but not pointed, like thoſe of acanthopterygeous fiſhes.

MALACOSTOMOUS fishes, thoſe deſtitute of teeth in the jaws, called in Engliſh *leather-mouthed*, as the tench, carp, bream, &c.

MALAGA, an ancient, rich, and ſtrong town of Spain, in the kingdom of Granada, with two caſtles, a biſhop's ſee, and a good harbour, which renders it a place of conſiderable commerce. The advantage

Malagrida.

of this commerce, according to M. Bourgoanne, is entirely in favour of Spain, but almoſt without any to its navigation; of 842 veſſels which arrived at this port in 1782, from almoſt every commercial nation, ſcarcely 100 were Spaniſh, even reckoning the ſhips of war which anchored there. The Engliſh, who are in poſſeſſion of the greateſt part of the trade, carry thither woollens and great quantities of ſmall ware; the Dutch carry ſpice, cutlery ware, laces, ribbons, thread, &c. Theſe nations, thoſe of the north, and Italy, export to the amount of two millions and a half of piaſtres in wines, fruits, ſumach, pickled anchovies, oil, &c. and all they carry thither amounts only to about a million and a half. The balance would be ſtill more advantageous for Malaga if the ſilk and wool of the kingdom of Granada were exported from this port; but theſe are employed in the country where they are produced. The ſtreets of Malaga are narrow, but there are ſome good ſquares; and the cathedral church is a ſuperb building, ſaid to be as large as St Paul's. The only other building of note is the biſhop's palace; which is a large edifice, but looks inſignificant from its being ſituated near the other. Its prelate enjoys a revenue of 16,000l. ſterling. Malaga is ſeated on the Mediterranean ſea, at the foot of a craggy mountain. W. Long. 4. 10. N. Lat. 36. 51.

MALAGRIDA, Gabriel, an Italian Jeſuit, was choſen by the general of the order to conduct miſſions into Portugal. To great eaſe and fluency of ſpeech, for which he was indebted to enthuſiaſm, he added the moſt ardent zeal for the intereſt of the ſociety to which he belonged. He ſoon became the faſhionable director; and every one, ſmall or great, placed himſelf under his conduct. He was reſpected as a ſaint, and conſulted as an oracle. When a conſpiracy was formed by the duke d'Aveiro againſt the king of Portugal, it is aſſerted by the enemies of the ſociety, that three Jeſuits, among whom was Malagrida, were conſulted concerning the meaſure. They add (what is very improbable), that it was decided by theſe caſuiſts, that it was only a venial crime to kill a king who perſecuted the ſaints. At that time the king of Portugal, ſpurred on by a miniſter who had no favour for the Jeſuits, openly declared himſelf againſt them, and ſoon after baniſhed them from his kingdom. Only three of them were apprehended, Malagrida, Alexander, and Mathos, who were accuſed of having approved this murder. But either the trial could not be proceeded in without the conſent of the pope, which was not granted, or no proof could be got ſufficient to condemn Malagrida; and therefore the king was obliged to deliver him to the Inquiſition, as being ſuſpected of having formerly advanced ſome raſh propoſitions which bordered on hereſy. Two publications which he acknowledged, and which give the fulleſt indications of complete inſanity, were the foundation of theſe ſuſpicions. The one was written in Latin, and entitled *Tractatus de vita et imperio Antichriſti*; the other in Portugueſe, under the title of the "Life of St Anne, compoſed with the aſſiſtance of the bleſſed Virgin Mary and her moſt holy Son." They are full of extravagance and abſurdity.—This enthuſiaſt pretended to have the gift of miracles. He confeſſed before the judges of the Inquiſition, that God himſelf had declared him his ambaſſador, apoſtle, and prophet; that he was united to God by a perpetual union; and that the Virgin Mary, with the conſent of Jeſus Chriſt and of the whole Trinity, had declared him to be her ſon. In ſhort, he confeſſed, as is pretended, that he felt in the priſon, at the age of 72, ſome emotions very uncommon at that period of life, which at firſt gave him great uneaſineſs, but that it had been revealed to him by God that theſe motions were only the natural effect of an involuntary agitation, wherein there was the ſame merit as in prayer. It was for ſuch extravagancies, that this unfortunate wretch was condemned by the Inquiſition: but his death was haſtened by a viſion which he eagerly revealed. Upon occaſion of the death of the marquis de Tancourt, commander in chief of the province of Eſtremadura, mournful and continued diſcharges were made in honour of him by the caſtle of Liſbon, and by all the forts on the banks of the Tagus. Theſe being heard by Malagrida in his dungeon, he inſtantly ſuppoſed, from their extraordinary nature, and from their happening during the night, that the king was dead. The next day he demanded an audience from the members of the Inquiſition: which being granted, he told them that he had been ordered by God to ſhow the miniſter of the holy office that he was not a hypocrite, as was pretended; for the king's death had been revealed to him, and he had ſeen in a viſion the torments to which his majeſty was condemned for having perſecuted the religious of his order. This was ſufficient to accelerate his puniſhment: he was burnt on the 21ſt of September 1761, not as the accomplice of a parricide, but as a falſe prophet, for which he deſerved to be confined in bedlam rather than tied to the ſtake. The acts of impiety whereof he was accuſed were nothing more than extravagancies proceeding from a miſtaken devotion and an overheated brain.

M[illegible]

MALDEN, a town of Eſſex, 37 miles from London, ſituated on an eminence at the conflux of the Chalmer and Pant or Blackwater, where they enter the ſea. It was the firſt Roman colony in Britain, and the ſeat of ſome of the old Britiſh kings. It was beſieged, plundered, and burnt by Queen Boadicea; but the Romans repaired it. It was again ruined by the Danes, but rebuilt by the Saxons. It has a convenient haven on an arm of the ſea for veſſels of 400 tons; and a conſiderable trade in coals, iron, corn, and deals. A little beyond it begins Blackwater bay, famous for the Walfleet oyſters. The channel called Malden water is navigable to the town. King Edward the elder (of the Saxon race) reſided here whilſt he built Witham and Hertford caſtles. On the weſt ſide of the town are the remains of a camp.

MALALEUCA, the Cayputi tree, a genus of plants belonging to the polyadelphia claſs. See Botany *Index*. This plant, which is a native of the Moluccas, yields the oil called *Cayputi*.

MALDIVIA islands, a cluſter of ſmall iſlands in the Indian ocean, 500 miles ſouth-weſt of the continent of the iſland of Ceylon. They are about 1000 in number, and are very ſmall; extending from the ſecond degree of ſouth latitude to the ſeventh degree of north latitude. They are generally black low lands, ſurrounded by rocks and ſands. The natives are of the ſame complexion with the Arabians, profeſs the

Maldivian dominion, and are ſubject to one ſovereign. The channels between the iſlands are very narrow, and ſome of them are fordable. They produce neither rice, corn, nor herbage; but the natives live upon cocoa-nuts, and other fruits, roots, and fiſh. They have little or nothing to barter with, unleſs the ſhells called cowry, or *blackamoor's teeth*, with which they abound: and theſe ſerve inſtead of ſmall coin in many parts of India.

MALE, among zoologiſts, that ſex of animals which has the parts of generation ſituated externally. See SEX and GENERATION.

The term *male* has alſo, from ſome ſimilitude to that ſex in animals, been applied to ſeveral inanimate things; thus we ſay, a male flower, a male ſcrew, &c. See MAS *Planta*, MASCULUS *Flos*, and SCREW; alſo FEMALE and FLOS.

MALEBRANCHE, NICHOLAS, an eminent French metaphyſician, the ſon of Nicholas Malebranche, ſecretary to the French king, was born in 1638, and admitted into the congregation of the oratory in 1660. He at firſt applied himſelf to the ſtudy of languages and hiſtory; but afterwards meeting with Des Cartes's *Treatiſe of Man*, he gave himſelf up entirely to the ſtudy of philoſophy. In 1699, he was admitted an honorary member of the Royal Academy of Sciences at Paris. Notwithſtanding he was of a delicate conſtitution, he enjoyed a pretty good ſtate of health till his death, which happened in 1715. at the age of 77. Father Malebranche read little, but thought a great deal. He deſpiſed that kind of philoſophy which conſiſts only in knowing the opinions of other men, ſince a perſon may know the hiſtory of other men's thoughts without thinking himſelf. He could never read ten verſes together without diſguſt. He meditaed with his windows ſhut, in order to keep out the light, which he found to be a diſturbance to him. His converſation turned upon the ſame ſubjects as his books; but was mixed with ſo much modeſty and deference to the judgement of others, that it was extremely and univerſally deſired. His books are famous; particularly his *Recherche de la Verité*, i. e. "Search after truth:" his deſign in which is, to point to us the errors into which we are daily led by our ſenſes, imagination, and paſſions; and to preſcribe a method for diſcovering the truth, which he does, by ſtarting the notion of ſeeing all things in God. And hence he is led to think and ſpeak merely of human knowledge, either as it lies in written books, or in the book of nature, compared with that light which diſplays itſelf from the ideal world; and, by attending to which, with pure and defecate minds, he ſuppoſes knowledge to be moſt eaſily had. The fineneſs of this author's ſentiments, together with his fine manner of expreſſing them, made every body admire his genius and abilities; but he has generally paſſed for a viſionary philoſopher. Mr Locke, in his examination of Malebranche's opinion of ſeeing all things in God, ſtyles him "an acute and ingenious author;" and tells us, that there are "a great many very fine thoughts, judicious reaſonings, and uncommon reflections in his *Recherches*." But Mr Locke, in that piece, endeavours to refute the chief principles of his ſyſtem. He wrote many other pieces beſides that we have mentioned, all tending ſome way or other to confirm his main ſyſtem, eſtabliſhed in the *Recherche*, and to clear it from the objections which were brought againſt it, or from the conſequences which were deduced from it; and if he has not attained what he aimed at in theſe ſeveral productions, he has certainly ſhown great abilities and a vaſt force of genius.

MALESHERBES, CHRISTIAN-WILLIAM DE LAMOIGNON DE, was born at Paris in 1721. He was ſon of the chancellor of France, William de Lamoignon, who was deſcended of an illuſtrious family. His early education he received at the Jeſuits college, applying himſelf afterwards to the ſtudy of the law with great aſſiduity, as well as hiſtory and political economy. He was choſen a counſellor of the parliament of Paris at the age of 24, and ſucceeded his father as preſident of the court of aids in the year 1750. With the preſidentſhip of the court of aids he received the ſuperintendance of the preſs, in whoſe hands it became the means of promoting liberty to a degree beyond all former example in that country. As he firmly believed that deſpotiſm alone had any reaſon to dread the liberty of the preſs, he was anxious to give it every extenſion conſiſtent with ſound policy and the ſtate of public opinion. Through his favour the French Encyclopædia, the works of Rouſſeau, and many other free ſpeculations, iſſued from the preſs, in defiance of the terrific anathemas of the Sorbonne. This had its own weight in paving the way to the horrors of the revolution, which Maleſherbes did not probably foreſee; yet it had alſo the happy effect of freeing the minds of men from the fetters of ignorance and ſuperſtition, and of enlightening them reſpecting their rights and duties in ſociety.

The ſuperintendance of the preſs having been taken from him, to confer it on that tool of deſpotiſm Maupeou, he was only the more intent on fulfilling the duties of his preſidentſhip, and oppoſing arbitrary power with all his vigour, being thus freed from a number of other cares. When the proceedings of the court of aids were to be prohibited, on account of the ſpirited conduct of Maleſherbes in the caſe of one Monnerat, who had been moſt unjuſtly treated by the farmers of the revenue, he preſented a remonſtrance to the king, containing a free proteſt againſt the enormous abuſes of lettres de cachet, by which every man's liberty was rendered precarious, concluding with theſe memorable words; "no one is great enough to be ſecure from the hatred of a miniſter, nor little enough not to merit that of a clerk." Soon after this he was baniſhed to his country-ſeat by a lettre de cachet, and the duke de Richelieu at the head of an armed force aboliſhed the tribunal. In this ſtate of retirement he committed to paper a number of obſervations on the political and judicial ſtate of France, on agriculture and natural hiſtory, which all periſhed in the wreck of the revolution.

On the acceſſion of Louis XVI. to the throne in 1774, he received an order to appear at the place where the court of aids had ſat, and reſume the preſidentſhip of the tribunal thus reſtored. He laid before the new ſovereign an ample memoir on the calamitous ſtate of the kingdom, with a free expoſure of the faults by which it had been produced, from a firm conviction that truth at all times ſhould have acceſs to the throne. His ſentiments ſo fully accorded with thoſe of the

Maleſherbes. the young king, whoſe mind was not yet corrupted, that he was choſen miniſter of ſtate in the year 1775, in which elevated rank he was only ambitious to extend the ſphere of his uſefulneſs. His firſt care was to viſit the priſons, and reſtore to liberty the innocent victims of the former reign. His adminiſtration was alſo diſtinguiſhed by the powerful encouragement of commerce and agriculture, being ſupported in his laudable endeavours by the able and virtuous Turgot, at that time comptroller-general of the revenue, who having loſt his place through the intrigues of financiers, Maleſherbes did not long retain his office after him. As he failed in his benevolent endeavours to ameliorate the condition of Proteſtants reſpecting the ſolemnization of marriage and the legitimating of their children, he reſigned his office in the month of May 1776.

Being fond of travelling, and reſolved to mix freely with people of every deſcription, in order to acquire an accurate knowledge of human nature, he aſſumed the humble title of M. Guillaume, and commenced his journey in a ſimple, frugal manner. He travelled through France, Switzerland and Holland, frequently on foot, and lodged in villages, to have a nearer ſurvey of the ſtate of the country. He made memorandums, with the greateſt care, of whatever he conceived to be worthy of obſervation reſpecting the productions of nature and the operations of induſtry; and after an abſence of ſome years he returned to his favourite manſion, fully fraught with ſuch a ſtock of valuable knowledge as his age and experience qualified him to appreciate.

Finding on his return that his native country was far advanced in philoſophical principles, he drew up two elaborate memoirs to the king, one of them on the condition of the Proteſtants, and the other on civil liberty and toleration in general; and the difficulties with which miniſters now found themſelves ſurrounded, induced the king to call him to his councils, being a man who ſtood high in the eſteem of the whole nation, but he received no appointment to any particular office. In the critical ſtate in which he clearly ſaw the king ſtood, he made one effort for opening his eyes, by means of two ſpirited and energetic memoirs, "On the calamities of France, and the means of repairing them;" but, as the queen's party carried every thing before it, he was not even permitted to read them, and alſo denied a private interview with the ill-fated monarch, in conſequence of which he took his final leave of the court.

When by a decree of the national convention the unfortunate Louis was to be tried for his life, Maleſherbes generouſly offered to plead his cauſe, nobly forgetting the manner in which he had been baniſhed from his councils. He was the perſon who announced to him his cruel doom, and one of the laſt who took leave of him, when taken out to ſuffer. After this eventful period, he withdrew to his retreat with a deeply wounded heart, and refuſed to hear any thing more of what was acting on the bloody theatre of Paris. Walking one morning in his garden, he perceived four men coming towards his houſe, ſent by the convention to arreſt his daughter Madame Lepelletier Roſambo and her huſband, once preſident of the parliament of Paris; and the [illegible] of Maleſherbes [illegible] as a partner of [illegible], by the [illegible]. The real is, the convention never forgave his defence of the unfortunate king; an action, however, in which he himſelf always gloried.

On the fatal day, this great man left the priſon with a ſerene countenance; and, happening to ſtumble againſt a ſtone, he ſaid (with the pleaſantry of Sir Thomas More), "a Roman would have thought this an unlucky omen, and walked back again." He converſed with his children in the cart, took an affectionate farewell, and received the ſtroke in April 1794, in the 73d year of his age. Thus fell, by the inſatiable cruelty of a monſter, whoſe hatred to men of virtue and abilities was implacable, one of the moſt ſpotleſs and exemplary characters of the period at which he lived. The government afterwards made ſome reparation for the injuſtice done him, by ordering his buſt to be placed among thoſe of the great men who have reflected honour upon their country.

MALHERBE, Francois de, the beſt French poet of his time, was born at Caen about the year 1556, of a noble and ancient family. He quitted Normandy at 17 years of age; and went into Provence, where he attached himſelf to the family of Henry Angouleme, the natural ſon of King Henry II. and was in the ſervice of that prince till he was killed by Altoviti in 1586. At length Cardinal de Perron, being informed of his merit and abilities, introduced him to Henry IV. who took him into his ſervice. After that monarch's death, Queen Mary de Medicis ſettled a penſion of 500 crowns upon our poet, who died at Paris in 1628. The beſt and moſt complete edition of his poetical works is that of 1666, with Menage's remarks. Malherbe ſo far excelled all the French poets who preceded him, that Boileau conſiders him as the father of French poetry: but he compoſed with great difficulty, and put his mind on the rack in correcting what he wrote. He was a man of a ſingular humour, and blunt in his behaviour. When the poor uſed to promiſe him, that, that they would pray to God for him, he anſwered them, that "he did not believe they could have any great intereſt in heaven, ſince they were left in ſuch a bad condition upon earth; and that he ſhould be better pleaſed if the duke de Luyne, or ſome other favourite, had made him the ſame promiſe." He would often ſay that "the religion of gentlemen was that of their prince." During his laſt ſickneſs he had much ado to reſolve to confeſs to a prieſt; for which he gave this facetious reaſon, that "he never uſed to confeſs but at Eaſter." And ſome few moments before his death, when he had been in a lethargy two hours, he awaked on a ſudden to reprove his landlady, who waited on him, for uſing a word that was not good French; ſaying to his confeſſor, who reprimanded him for it, that "he could not help it, and he would defend the purity of the French language to the laſt moment of his life."

MALICE, in *Ethics* and *Law*, is a formed deſign of doing miſchief to another; it differs from hatred. In murder, it is malice makes the crime; and if a man, having a malicious intent to kill another, in the execution of his malice kills a perſon not intended, the malice [illegible] to his perſon, and he ſhall [illegible]. [illegible] may be either expreſs or implied in law. Expreſs malice is, when one, with a ſedate, deliberate mind, and formed deſign, kills another; which formed deſign is evidenced by external circumſtances diſcovering that intention; as lying in wait, antecedent menaces, former grudges, and concerted ſchemes to do him ſome bodily harm. Beſides, where no malice is expreſſed, the law will imply it; as where a man wilfully poiſons another, in ſuch a deliberate act the law preſumes malice, though no particular enmity can be proved. And if a man kills another ſuddenly, without any, or without a conſiderable provocation, the law implies malice; for no perſon, unleſs of an abandoned heart, would be guilty of ſuch an act upon a ſlight or no apparent cauſe.

MALIGNANT, among phyſicians, a term applied to diſeaſes of a very dangerous nature, and generally infectious; ſuch are the dyſentery, hoſpital-fever, &c. in their worſt ſtages.

Malignity among phyſicians ſignifies much the ſame with contagion. See CONTAGION.

MALL, SEA-MALL, or *Sea-mew*. See LARUS, ORNITHOLOGY *Index*.

MALLARD. See ANAS, ORNITHOLOGY *Index*.

MALLEABLE, a property of metals, whereby they are capable of being extended under the hammer.

MALLENDERS. See FARRIERY *Index*.

MALLEOLI, in the ancient art of war, were bundles of combuſtible materials, ſet on fire to give light in the night, or to annoy the enemy; when they were employed for the latter purpoſe they were ſhot out of a bow, or fixed to a javelin, and thus thrown into the enemies engines, ſhips, &c. in order to burn them. Pitch was always a principal ingredient in the compoſition. The malleoli had alſo the name of *pyroboli*.

MALLET, or MALLOCH, *David*, an Engliſh poet, but a Scotſman by birth, was born in that country about 1700. By the penury of his parents, he was compelled to be janitor of the high ſchool at Edinburgh; but he ſurmounted the diſadvantages of his birth and fortune; for when the duke of Montroſe applied to the college of Edinburgh for a tutor to educate his ſons, Malloch was recommended. When his pupils went abroad, they were intruſted to his care; and having conducted them through their travels, he returned with them to London. Here, reſiding in their family, he naturally gained admiſſion to perſons of high rank and character, and began to give ſpecimens of his poetical talents. In 1733, he publiſhed a poem on verbal Criticiſm, on purpoſe to make his court to Pope. In 1740, he wrote a Life of Lord Bacon, which was then prefixed to an edition of his works; but with ſo much more knowledge of hiſtory than of ſcience, that, when he afterwards undertook the Life of Marlborough, ſome were apprehenſive leſt he ſhould forget that Marlborough was a general, as he had forgotten that Bacon was a philoſopher. The old ducheſs of Marlborough aſſigned in her will this taſk to Glover and Mallet, with a reward of 1000l. and a prohibition to inſert any verſes. Glover is ſuppoſed to have rejected the legacy with diſdain, ſo that the work devolved upon Mallet; who had alſo a penſion from the late duke of Marlborough to promote his induſtry, and who was continually talking of the diſcoveries he made, but left not when he died any hiſtorical labours behind. When the prince of Wales was driven from the palace, and kept a ſeparate court by way of oppoſition, to increaſe his popularity by patronizing literature, he made Mallet his under ſecretary, with a ſalary of 200l. a year.—Thomſon likewiſe had a penſion; and they were aſſociated in the compoſition of the Maſque of Alfred, which in its original ſtate was played at Cliefden in 1740. It was afterwards almoſt wholly changed by Mallet, and brought upon the ſtage of Drury Lane in 1751, but with no great ſucceſs. He had before publiſhed two tragedies; Eurydice, acted at Drury Lane in 1731; and Muſtapha, acted at the ſame theatre in 1739. It was dedicated to the prince his maſter, and was well received, but never was revived. His next work was Amyntor and Theodora (1747), a long ſtory in blank verſe; in which there is copiouſneſs and elegance of language, vigour of ſentiment, and imagery well adapted to take poſſeſſion of the fancy. In 1753, his maſque of Britannia was acted at Drury Lane, and his tragedy of Elvira in 1763; in which year he was appointed keeper of the book of entries for ſhips in the port of London. In the beginning of the laſt war, when the nation was exaſperated by ill ſucceſs, he was employed to turn the public vengeance upon Byng, and wrote a letter of accuſation under the character of a Plain Man. The paper was with great induſtry circulated and diſperſed; and he for his ſeaſonable intervention had a conſiderable penſion beſtowed upon him, which he retained to his death. Towards the end of his life he went with his wife to France; but after a while, finding his health declining, he returned alone to England, and died in April 1765. He was twice married, and by his firſt wife had ſeveral children. One daughter, who married an Italian of rank named Cileſia, wrote a tragedy called Almida, which was acted at Drury Lane. His ſecond wife was the daughter of a nobleman's ſteward, who had a conſiderable fortune, which ſhe took care to retain in her own hands. His ſtature was diminutive, but he was regularly formed; his appearance, till he grew corpulent, was agreeable, and he ſuffered it to want no recommendation that dreſs could give it. His converſation was elegant and eaſy.

MALLET, *Edme*, was born at Melun in 1713, and enjoyed a curacy in the neighbourhood of his native place till 1751, when he went to Paris to be profeſſor of theology in the college of Navarre, of which he was admitted a doctor. Boyer, the late biſhop of Mirepoix, was at firſt much prejudiced againſt him; but being afterwards undeceived, he conferred upon him the ſee of Verdun as a reward for his doctrine and morals. Janſeniſm had been imputed to him by his enemies with this prelate; and the gazette which went by the name of *Eccleſiaſtical*, accuſed him of impiety. Either of theſe imputations was equally undeſerved by the abbé Mallet: as a Chriſtian, he was grieved at the diſputes of the French church; and, as a philoſopher, he was aſtoniſhed that the government had not, from the very beginning of thoſe diſſenſions impoſed ſilence on both parties. He died at Paris in 1755, at the age of 42. The principal of his works are, 1. *Principes pour la lecture des Poëtes*, 1745, 12mo, 2 vols. 2. *Eſſai ſur l'Etude des Belles Lettres*, 1747, Mallet, Mallicollo.

12mo. 3. *Eſſai ſur les bienſéances oratoires*, 1753, 12mo. 4. *Principes pour la lecture des Orateurs*, 1753, 12mo. 3 vols. 5. *Hiſtoire des Guerres civiles de France, ſous les regnes de François* II. *Charles* IX. *Henri* III. *et Henry* IV. tranſlated from the Italian of d'Avila.—In Mallet's work on the Poets, Orators, and the Belles Lettres, his object is no more than to explain with accuracy and preciſion the rules of the great maſters, and to ſupport them by examples from authors ancient and modern. The ſtyle of his different writings, to which his mind bore a great reſemblance, was neat, eaſy, and unaffected. But what muſt render his memory eſtimable, was his attachment to his friends, his candour, moderation, gentleneſs, and modeſty. He was employed to write the theological and belles lettres articles in the *Encyclopédie*; and whatever he wrote in that dictionary was in general well compoſed. Abbé Mallet was preparing two important works when the world was deprived of him by death. The firſt was *Une Hiſtoire generale de nos Guerres depuis le commencement de la Monarchie*; the ſecond, *Une Hiſtoire de Concile de Trente*, which he intended to ſet in oppoſition to that of Father Paul tranſlated by Father le Courayer.

Mallet, a large kind of hammer made of wood; much uſed by artificers who work with a chiſſel, as ſculptors, maſons, and ſtone-cutters, whoſe mallet is ordinarily round; and by carpenters, joiners, &c. who uſe it ſquare. There are ſeveral ſorts of mallets uſed for different purpoſes on ſhip-board. The calking mallet is chiefly employed to drive the oakum into the ſeams of a ſhip, where the edges of the planks are joined to each other in the ſides, deck, or bottom. The head of this mallet is long and cylindrical, being hooped with iron to prevent it from ſplitting in the exerciſe of calking. There is alſo the ſerving mallet, uſed in ſerving the rigging, by binding the ſpun-yarn more firmly about it than it could poſſibly be done by hand, which is performed in the following manner; the ſpun-yarn being previouſly rolled up in a large ball or clue, two or three turns of it are paſſed about the rope, and about the body of the mallet, which for this purpoſe is furniſhed with a round channel in its ſurface, that conforms to the convexity of the rope intended to be ſerved. The turns of the ſpun-yarn being ſtrained round the mallet, ſo as to confine it firmly to the rope, which is extended above the deck, one man paſſes the ball continually about the rope, whilſt the other, at the ſame time, winds on the ſpun-yarn by means of the mallet, whoſe handle acting as a lever ſtrains every turn about the rope as firm as poſſible.

MALLICOLLO, one of the largeſt of the New Hebrides, in the Pacific ocean. It extends twenty leagues from north to ſouth. Its inland mountains are very high, and clad with foreſts. Its vegetable productions are luxuriant, and in great variety; cocoa-nuts, breadfruit, bananas, ſugar-canes, yams, eddoes, turmeric, and oranges. Hogs and common poultry are the domeſtic animals. The inhabitants appear to be of a race totally diſtinct from thoſe of the Friendly and Society Iſlands. Their form, language, and manners, are widely different. They ſeem to correſpond in many particulars with the natives of New Guinea, particularly in their black colour and woolly hair. They go almoſt naked, are of a ſmall ſtature, have lively but very irregular ugly features, and tie a rope faſt round their belly. They uſe bows and arrows as their principal weapons, and the arrows are ſaid to be ſometimes poiſoned. They keep their bodies entirely free from punctures, which is one particular that remarkably diſtinguiſhes them from the other tribes of the Pacific ocean.

The population, according to Mr Forſter, may amount to [illegible], who occupy [illegible] ſquare miles of ground. The ſame author inform us that very few women were ſeen, but that thoſe few were no leſs ugly than the men, were of ſmall ſtature, and their heads, faces, and ſhoulders were painted red. They had bundles on their backs containing their children, and the men ſeemed to have no kind of reſpect for them. They appeared in fact to be oppreſſed, deſpiſed, and in a ſtate of ſervility.

The men uſe bows and arrows, and a club about 30 inches long, which they hang on their right ſhoulder, from a thick rope made of a kind of graſs. They live chiefly on vegetables, and apply themſelves to huſbandry. Their muſic had nothing remarkable in it, either for harmony or variety, but ſeemed to Mr Forſter to be of a more lively turn than that at the Friendly iſlands. In ſome of their countenances he thought he could trace a miſchievous, ill-natured diſpoſition, but he confeſſes that he might miſtake jealouſy for hatred. It is in 16° 28′ S. Lat. and 167° 56′ E. Long.

MALLOW, a manor, and alſo a borough town in the county of Cork, and province of Munſter, in Ireland, above 118 miles from Dublin, pleaſantly ſituated on the north bank of the Blackwater, over which there is an excellent ſtone bridge. Not far diſtant is a fine ſpring of a moderately tepid water, which burſts out of the bottom of a fine limeſtone rock, and approaches the neareſt in all its qualities to the hot-well waters of Briſtol of any that has been yet diſcovered in this kingdom, which brings a reſort of good company there frequently in the ſummer months, and has cauſed it to be called the *Iriſh Bath*.

Mallow. See Malva, Botany *Index*.

Marſh-Mallow. See Althæa, Botany *Index*.

Indian-Mallow. See Sida, Botany *Index*.

MALMSBURY, a town of Wiltſhire in England, 95 miles from London. It ſtands on a hill, with ſix bridges over the river Avon at the bottom; with which and a brook that runs into it, it is in a manner encompaſſed. It formerly had walls and a caſtle, which were pulled down to enlarge the abbey, which was the biggeſt in Wiltſhire, and its abbots ſat in parliament. The Saxon king Athelſtan granted the town large immunities, and was buried under the high altar of the church, and his monument ſtill remains in the nave of it. The memory of Aldhelm, its firſt abbot, who was the king's great favourite, and whom he got to be canonized after his death, is ſtill kept up by a meadow near this town, called Aldhelm's Mead. By charter of King William III. the corporation conſiſts of an alderman, who is choſen yearly; 12 capital burgeſſes, and 4 aſſiſtants, landholders, and commoners. Here is an almſhouſe for 4 men and 4 women; and near the bridge an hoſpital for lepers, where it is ſuppoſed there was formerly a nunnery. The town drives a conſiderable trade in the woollen manufacture,

has

Malmſbury, Malo.

has a market on Saturday, and three fairs. It has ſent members to parliament ever ſince the 26th of Edward I.

William of Malmsbury. See William.

MALO, St, a ſea-port town of France, in the province of Britanny, ſituated in the latitude of 48 degrees 38 minutes north, and 1 degree 57 minutes to the weſt. The town ſtands upon a rock called the iſland of St Aaron, ſurrounded by the ſea at high water, which is now joined to the continent, by means of a ſort of cauſeway or dike, near a mile long, called the Sillon, which has often been damaged by ſtorms, and was almoſt quite ruined in the year 1730. At the end of this cauſeway next the town is a caſtle, flanked with large towers, a good ditch, and a large baſtion. The city nearly covers the whole ſurface of the iſland, and is of an oblong form, ſurrounded with a ſtrong rampart, on which there is a number of cannon.—There is always in it a good garriſon. The cathedral church is dedicated to St Vincent, and ſtands in the ſquare of the ſame name, as do alſo the town-houſe and the epiſcopal palace. There are ſome other ſquares in the town, but leſs remarkable; and as to the ſtreets, except two or three, they are all very narrow. There being no ſprings of freſh water in St Malo, the inhabitants are at great pains to convey the rain which falls on the roofs of their houſes into ciſterns; and of this they have enough for all family uſes. There is only one pariſh church in the town, though it contain between 9000 and 10,000 inhabitants; but there are ſeveral convents of monks and nuns, and a general hoſpital. The two entrances into the harbour are defended by ſeveral forts, ſuch as that of the Conchal; of the great and the little bay; the forts of Iſle Rebours, Sezembre, Roteneuf; the caſtle of Latte, and Fort-Royal. Theſe are ſeveral little iſles near the harbour, the moſt conſiderable whereof is that of St Sezembre, which is near a quarter of a league in circumference, and ſerve as ſo many outworks to the fortifications of the city, and are uſeful as bulwarks, by breaking the violence of the waves, which otherwiſe would beat with great force againſt the walls of the city. At the end of the cauſeway next the continent ſtands the ſuburb of St Servant, large and well built. Here the merchants have their houſes and ſtorehouſes. Here is the dock-yard; and a ſecure harbour is formed by the river Rance, where ſhips of great burden can ride at anchor very near the houſes. The harbour is one of the beſt in the kingdom, and moſt frequented by merchant ſhips; but it is of very difficult and dangerous acceſs on account of the rocks which lie round it. The town of St Malo is exceedingly well ſituated for trade; and accordingly, in this reſpect, it has ſucceeded beyond moſt towns in France. It maintains a trade with England, Holland, and Spain.—The commerce of Spain is of all the moſt conſiderable, and moſt profitable to the inhabitants of St Malo, the ſhips of the Malouins being frequently employed as regiſter ſhips by the Spaniards, to carry out the rich cargoes to Peru and Mexico, and bring home treaſure and plate from America. The inhabitants of St Malo carry on alſo a conſiderable trade in dry and ſalted cod to Newfoundland. They ſend to this iſland a good many veſſels from 100 to 300 tons burden, with ſalt for the fiſh, and proviſions for ſubſiſting the crews. They carry their fiſh to Italy, Spain, and ſome to Bourdeaux and Bayonne, and bring home the returns in fruits, ſoap, oil, &c. which are diſpoſed of to great advantage at Nantz. St Malo is the capital of the biſhopric of that name, which is of conſiderable extent; and the ſoil about it produces moſt kinds of grain and fruits in great abundance. The moſt remarkable towns in the diſtrict and dioceſe of St Malo, are St Servand, Cancalle, Chateauneuf, Dinan, Tintiniac, Combourg, Montfort, Breal, Guer, Ploermel, Joſſelin, &c.

Malo, Malouin.

MALO, Maclou, or *Mahout*, Saint, the ſon of an Engliſhman, and couſin to St Magloire, was educated in a monaſtery in Ireland, and afterwards choſen biſhop of Gui-Caſtel, a dignity which his humility prevented him from accepting. The people wiſhing to compel him, he went to Britanny, and put himſelf under the direction of a holy anchoret called Aaron, in the neighbourhood of Aleth. Some time after, about the year 541, he was choſen biſhop of that city, and there cultivated piety and religion with great ſucceſs. He afterwards retired to a ſolitude near Xaintes, where he died November 15. 565. From him the city of St Malo derives its name; his body having been carried thither, after the reduction of Aleth to a ſmall village called *Guidalet* or *Guichalet*, and the transference of the epiſcopal ſee to St Malo.

MALOUIN, Paul-Jaques, born at Caen in 1701, was profeſſor of medicine in the royal college of Paris, phyſician in ordinary to the queen, and a member of the Royal Society of London, and of the Academy of Sciences of Paris. Theſe ſtations were a proper reward for his very extenſive information in medicine and chemiſtry; and his amiable and ſteady character procured him many friends and protectors. He was very unlike ſome modern phyſicians, who put little truſt in medicine; and was greatly diſpleaſed to hear any ill ſpoken of his profeſſion. He obſerved one day to a young man who took this liberty, that all great men had reſpected medicine: *Ah!* ſaid the young fellow, *you muſt at leaſt except from the liſt one Moliere. But then*, inſtantly replied the doctor, *you ſee he is dead.* He is ſaid to have believed the certainty of his art as firmly as a mathematician does that of geometry. Having preſcribed a great many medicines for a celebrated man of letters, who followed his directions exactly, and was cured, Malouin eagerly embraced him, ſaying, *You deſerve to be ſick.* As he valued the rules of medicine ſtill more on his own account than on that of others, he obſerved, eſpecially in the latter part of his life, a very auſtere regimen. He ſtrictly practiſed the preſervative part of medicine, which is much more certain in its effects than the reſtorative. To this regimen Malouin was indebted, for what many philoſophers have deſired in vain, a healthy old age and an eaſy death. He was a ſtranger to the infirmities of age; and died at Paris of an apoplexy, the 3d of January 1778, in the 77th year of his age. By his will he left a legacy to the faculty of medicine, upon condition of their holding a public meeting every year for the purpoſe of [illegible] [illegible] of its labours and diſcoveries. Malouin was [illegible], but at the ſame time very diſintereſted. After two years of [illegible] [illegible], he left Paris and went to Verſailles, where he [illegible] that he had *retired to the court.* His principal works are, 1. *Traité de Chimie*, 1734, 12mo. 2. *Chimie Médicinale*, 2 vols. 12mo, 1755; a book full of curious obſervations, and written in a chaſte and well arranged ſtyle. He had the character of a laborious chemiſt; and he was a well-informed and even a diſtinguiſhed one for the age in which he lived: but his knowledge of chemiſtry, it muſt be confeſſed, was very imperfect, compared with the ſtate of the ſcience in the preſent age, in which it has aſſumed a new face, that probably will not be the laſt. 3. Some of the articles in the Collection publiſhed by the Academy of Sciences on the arts and profeſſions. A circumſtance which happened at a meeting of the academy does as much honour to his heart, as any of his works do to his underſtanding. A new treatiſe on the art of baking, wherein ſome of Malouin's ideas were combated, was read by M. Parmentier before his fellows, among whom was the old doctor. The young academician, who knew how eaſily ſelf-love is hurt, was afraid to meet his looks: but no ſooner was the reading finiſhed, than Malouin went up to him, and embracing him, "Receive my reſpects (ſaid he), you have ſeen farther into the ſubject than I did." 4. He was likewiſe the author of the chemical articles in the *Encyclopédie.*

Of the ſame family was *Charles Malouin*, who graduated as a doctor of medicine in the univerſity of Caen, and died in 1718 in the flower of his age. He publiſhed a Treatiſe on Solids and Fluids, Paris 1718, 12mo.

MALPAS, a town of Cheſhire, 166 miles from London. It ſtands on a high hill, not far from the river Dee, on the borders of Shropſhire; has a grammar ſchool, and an hoſpital, and had formerly a caſtle. It is called in Latin *Mala Platea*, i. e. "Ill Street," and was, for the ſame reaſon, by the Normans, called *Mal Pas;* but its three ſtreets, of which it chiefly conſiſts, are now well paved; and here is a benefice rich enough to ſupport two rectors, who officiate alternately in its ſtately church. It has a good market on Mondays, and three fairs in the year.

MALPIGHI, Marcellus, an eminent Italian phyſician and anatomiſt in the 17th century. He ſtudied under Maſſari and Mariano. The duke of Tuſcany invited him to Piſa, to be profeſſor of phyſic there. In this city he contracted an intimate acquaintance with Borelli, to whom he aſcribed all the diſcoveries he had made. He went back to Bologna, the air of Piſa not agreeing with him. Cardinal Antonio Pignatelli, who had known him while he was legate at Bologna, being choſen pope in 1691, under the name of *Innocent XII.* immediately ſent for him to Rome, and appointed him his phyſician. But this did not hinder him from purſuing his ſtudies, and perfecting his works, which have immortalized his memory. He died in 1694; and his works, with his life written by himſelf, prefixed, were firſt collected and printed at London, in folio, in 1667.

MALPIGHIA, Barbadoes cherry; a genus of plants belonging to the decandria claſs; and in the natural method ranking under the 23d order, *Trihilatæ.* See Botany *Index.*

MALPLAQUET, a village of the Netherlands, in Hainault, famous for a moſt bloody battle fought here on the 11th of September 1709, between the French under old Marſhal Villars, and the allies commanded by Prince Eugene and the duke of Marlborough. The French army amounted to 120,000 men; and were poſted behind the woods of La Marte and Teniers, in the neighbourhood of Malplaquet. They had fortified their ſituation in ſuch a manner with lines, hedges, and trees laid acroſs, that they ſeemed to be quite inacceſſible. In this ſituation they expected certain victory; and even the common ſoldiers were ſo eager to engage, that they flung away the bread which had been juſt given them, though they had taken no ſuſtenance for a whole day before. The allied army began the attack early in the morning, being favoured by a thick fog. The chief fury of their impreſſion was made upon the left of the enemy; and with ſuch ſucceſs, that, notwithſtanding their lines and barricadoes, the French were in leſs than an hour driven from their entrenchments. But on the enemy's right the combat was ſuſtained with much greater obſtinacy. The Dutch, who carried on the attack, drove them from their firſt line; but were repulſed from the ſecond with great ſlaughter. The prince of Orange, who headed that attack, perſiſted in his efforts with incredible perſeverance and intrepidity, though two horſes had been killed under him, and the greater part of his officers ſlain and diſabled. At laſt, however, the French were obliged to yield up the field of battle; but not till after having ſold a dear-bought victory. Villars being dangerouſly wounded, they made an excellent retreat under the conduct of Bouflers, and took poſt near Gueſnoy and Valenciennes. The conquerors took poſſeſſion of the field of battle, on which above 20,000 of their beſt troops lay dead. The loſs of the French, it is ſaid, did not exceed 8000; and Marſhal Villars confidently aſſerted, that, if he had not been diſabled, he would have gained an undoubted victory.

MALT denotes barley cured, or prepared to fit it for making a potable liquor, under the denomination of *beer* or *ale*. See Brewing.

Malt-Liquors have different names as well as different virtues, properties, and uſes, both from the different manners of preparing the malt, whence they are diſtinguiſhed into *pale* and *brown;* and from the different manners of preparing or brewing the liquors themſelves; whence they are divided into *beer* and *ale*, *ſtrong* and *ſmall*, *new* and *old*.

Malt drinks are either pale or brown, as the malt is more or leſs dried on the kiln: that which is the ſlendereſt dried tinging the liquor leaſt in brewing, and therefore being called *pale;* whereas that higher dried, and as it were roaſted, makes it of a higher colour. A mixture of both theſe makes an amber colour; whence ſeveral of theſe liquors take their name.

Now, it is certain, the pale malt has moſt of the natural grain in it, and is therefore the moſt nouriſhing; but, for the ſame reaſon, it requires a ſtronger conſtitution to digeſt it. Thoſe who drink much of it, are uſually fat and ſleek in their bloom, but are often cut off by ſudden fevers; or, if they avoid this, they fall early into a diſtempered old age.

The brown malt makes a drink much leſs viſcid, and fitter to paſs the ſeveral ſtrainers of the body; but, if very ſtrong, it may lead on to the ſame inconveniences with the pale, though a ſingle debauch wears off much more eaſily in the brown.

Dr Quincy obſerves, that the beſt pale malt-liquors are thoſe brewed with hard waters, as thoſe of ſprings and wells, becauſe the mineral particles, wherewith theſe waters are impregnated, help to prevent the coheſions of thoſe drawn from the grain, and enable them to paſs the proper ſecretions the better; as the viſcid particles of the grain do likewiſe defend theſe from doing the miſchief they might otherwiſe occaſion. But ſofter waters ſeem beſt ſuited to draw out the ſubſtance of high dried malts, which retain many fiery particles in their contexture, and are therefore beſt loſt in a ſmooth vehicle.

For the differences in the preparation of malt liquors, they chiefly conſiſt in the uſe of hops, as in beer; or in the more ſparing uſe of them, as in ale.

The difference made by hops is beſt diſcovered from the nature and quality of the hops themſelves: theſe are known to be a ſubtle grateful bitter; in their compoſition, therefore, with this liquor, they add ſomewhat of an alkaline nature, i. e. particles that are ſublime, active, and rigid. By which means, the ropy viſcid parts of the malt are more divided and ſubtilized: and are therefore not only rendered more eaſy of digeſtion and ſecretion in the body, but alſo, while in the liquor, they prevent it from running into ſuch coheſions as would make it ropy, vapid, and ſour.

For want of this, in unhopped drinks, that clammy ſweetneſs, which they retain after working, ſoon turns them acid and unfit for uſe; which happens ſooner or later in proportion to the ſtrength they receive from the malt, and the comminution that has undergone by fermentation.

The different ſtrengths of malt liquors alſo make their effects different. The ſtronger they are, the more viſcid parts they carry into the blood; and though the ſpirituous parts make theſe imperceptible at firſt; yet when thoſe are evaporated, which will be in a few hours, the other will be ſenſibly felt by pains in the head, nauſeouſneſs at the ſtomach, and laſſitude or liſtleſſneſs to motion. This thoſe are the moſt ſenſible of who have experienced the extremes of drinking theſe liquors and wines; for a debauch of wine they find much ſooner worn off, and they are much more lively and briſk afterwards, than after fuddling malt liquors, whoſe viſcid remains will be long before they be ſhaken off.

Malt liquors, therefore, are, in general, the more wholeſome for being ſmall: i. e. of ſuch a ſtrength as is liable to carry a ſmall degree of warmth into the ſtomach, but not ſo great as to prevent their being proper diluters of the neceſſary food. Indeed, in robuſt people, or thoſe who labour hard, the viſcidities of the drink may be broken into convenient nouriſhment; but in perſons of another habit and way of living, they ſerve rather to promote obſtructions and ill humours.

The age of malt liquors is the laſt thing by which they are rendered more or leſs wholeſome. Age ſeems to do nearly the ſame thing as hops; for thoſe liquors which are longeſt kept are certainly the leaſt viſcid; age breaking the viſcid parts, and by degrees rendering them ſmaller, and fitter for ſecretion.

But this is always determined according to their ſtrength; in proportion to which, they will ſooner or later come to their full perfection as well as decay; for, when ale or beer is kept till its particles are broken and comminuted as far as they are capable, then it is that they are beſt; and, beyond this, they will be continually on the decay, till the finer ſpirits are entirely eſcaped, and the remainder becomes vapid and ſour.

Malt-Diſtillery. This is an extenſive article of trade; and by which very large fortunes are made. The art is to convert fermented malt liquors into a clear inflammable ſpirit, which may be either ſold for uſe in the common ſtate of a proof ſtrength, that is, the ſame ſtrength with French brandy; or is rectified into that purer ſpirit uſually ſold under the name of *ſpirit of wine;* or made into compound cordial waters, by being diſtilled again from herbs and other ingredients. See Brewing and Wash.

To brew with malt in the moſt advantageous manner, it is neceſſary, 1. That the ſubject be well prepared; 2. That the water be ſuitable and duly applied; and, 3. That ſome certain additions be uſed, or alterations made, according to the ſeaſon of the year, and the intention of the operator: and by a proper regulation in theſe reſpects, all the fermentable parts of the ſubject will thus be brought into the tincture, and become fit for fermentation.

The due preparation of the ſubject conſiſts in its being juſtly malted and well ground. When the grain is not ſufficiently malted, it is apt to prove hard, ſo that the water can have but very little power to diſſolve its ſubſtance; and if it be too much malted, a part of the fermentable matter is loſt in that operation. The harder and more flinty the malt is, the finer it ought to be ground; and in all caſes, when intended for diſtillation, it is adviſable to reduce it to a kind of finer or coarſer meal. When the malt is thus ground, it is found by experience that great part of the time, trouble, and expence of the brewing is ſaved by it, and yet as large a quantity of ſpirit will be produced; for thus the whole ſubſtance of the malt may remain mixed among the tincture, and be fermented and diſtilled among it. This is a particular that very well deſerves the attention of the malt diſtiller as that trade is at preſent carried on; for the deſpatch of the buſineſs, and the quantity of ſpirit procured, is more attended to than the purity or perfection of it.

The ſecret of this matter depends upon the thoroughly mixing or briſkly agitating and throwing the meal about, firſt in cold and then in hot water; and repeating this agitation after the fermentation is over, when the thick turbid waſh being immediately committed to the ſtill already hot and dewy with working, there is no danger of burning, unleſs by accident, even without the farther trouble of ſtirring, which in this caſe is found needleſs, though the quantity be ever ſo large, provided that requiſite care and cleanlineſs be uſed; and thus the buſineſs of brewing and fermenting may very commodiouſly be performed together, and reduced to one ſingle operation. Whatever water is made choice of, it muſt ſtand in a hot ſtate upon the prepared malt, eſpecially if a clear tincture be deſired; but a known and very great inconvenience attends its being applied too hot, or too near to a ſtate of boiling, or even ſcalding with regard to the malt. To ſave time in this caſe, and to prevent the malt running into lumps and clods, the beſt way is to put a certain meaſured quantity of cold water to the malt firſt; the malt is then to be ſtirred very well with this, ſo as to form a ſort of thin uniform paſte or pudding; after which the remaining quantity of water required may be added in a ſtate of boiling, without the leaſt danger of making what, in the diſtiller's language, is called a *pudden*.

In this manner the due and neceſſary degree of heat in the water, for the extracting all the virtues of the malt, may be hit upon very expeditiouſly, and with a great deal of exactneſs, as the heat of boiling water is a fixed ſtandard which may be let down to any degree by a proportionate mixture of cold water, due allowances being made for the ſeaſon of the year, and for the temperature of the air.

This little obvious improvement, added to the method juſt above hinted for the reducing brewing and fermentation to one operation, will render it practicable to very conſiderable advantage, and the ſpirit improved in quality as well as quantity.

A much more profitable method than that uſually practiſed for the fermenting malt for diſtillation, in order to get its ſpirit, is the following: Take ten pounds of malt reduced to a fine meal, and three pounds of common wheat meal: add to theſe two gallons of cold water, and ſtir them well together; then add five gallons of water, boiling hot, and ſtir altogether again. Let the whole ſtand two hours, and then ſtir it again; and when grown cold, add to it two ounces of ſolid yeaſt, and ſet it by looſely covered in a warmiſh place to ferment.

This is the Dutch method of preparing what they call the *waſh for malt ſpirit*, whereby they ſave much trouble and procure a large quantity of ſpirit: thus commodiouſly reducing the two buſineſſes of brewing and fermenting to one ſingle operation. In England the method is to draw and maſh for ſpirit as they ordinarily do for beer, only inſtead of boiling the wort, they pump it into large coolers, and afterwards run it into their fermenting backs, to be there fermented with yeaſt. Thus they beſtow twice as much labour as is neceſſary, and loſe a large quantity of their ſpirit by leaving the groſs bottoms out of the ſtill for fear of burning.

All ſimple ſpirits may be conſidered in the three different ſtates of low wines, proof ſpirit, and alcohol, the intermediate degrees of ſtrength being of leſs general uſe; and they are to be judged of only according as they approach to or recede from theſe. Low wines at a medium contain a ſixth part of pure inflammable ſpirit, five times as much water as ſpirit neceſſarily ariſing in the operation with a boiling heat. Proof goods contain about one half of the ſame totally inflammable ſpirit; and alcohol entirely conſiſts of it.

Malt low wines, prepared in the common way, are exceeding nauſeous; they have, however, a natural vinoſity or pungent agreeable acidity, which would render the ſpirit agreeable to the palate were it not for the large quantity of the groſs oil of the malt that abounds in it. When this oil is hindered in ſome meaſure from mixing itſelf among the low wines, by the ſtretching a coarſe flannel over the neck of the ſtill or at the orifice of the worm, the ſpirit becomes much purer in all reſpects; it is leſs fulſome to the taſte, leſs offenſive to the ſmell, and leſs milky to the eye. When theſe low wines, in the rectification into proof ſpirits, are diſtilled gently, they leave a conſiderable quantity of this groſs fetid oil behind them in the ſtill along with the phlegm; but if the fire be made fierce, this oil is again raiſed and brought over with the ſpirit; and being now broken ſomewhat more fine, it impregnates it in a more nauſeous manner than at firſt. This is the common fault both of the malt diſtiller and of the rectifier: the latter, inſtead of ſeparating the ſpirit from this naſty oil, which is the principal intent of his proceſs, attends only to the leaving the phlegm in ſuch quantity behind, that the ſpirit may be of a due ſtrength as proof or marketable goods, and brings over the oil in a worſe ſtate than before. To this inattention to the proper buſineſs of the proceſs, it is owing, that the ſpirit, after its ſeveral rectifications, as they are miſcalled, is often found more ſtinking than when delivered out of the hands of the malt diſtiller. All this may be prevented by the taking more time in the ſubſequent diſtillations, and keeping the fire low and regular; the ſudden ſtirring of the fire, and the haſty way of throwing on the freſh fuel, being the general occaſion of throwing up the oil by ſpurts, where the fire in general, during the proceſs, has not been ſo large as to do that miſchief.

The uſe of a balneum mariæ, inſtead of the common ſtill, would effectually prevent all this miſchief, and give a purer ſpirit in one rectification than can otherwiſe be procured in ten, or indeed according to the common methods at all.

Malt low wine, when brought to the ſtandard of proof ſpirit, loſes its milky colour, and is perfectly clear and bright, no more oil being contained in it than is perfectly diſſolved by the alcohol, and rendered miſcible with that proportion of phlegm, which is about one half the liquor: its taſte alſo is cleaner, though not more pleaſant; there being leſs of the thick oil to hang on the tongue than its own form; which is not the caſe in the low wines, where the oil being undiſſolved, adheres to the mouth in its own form, and does not paſs lightly over it.

When proof ſpirit of malt is diſtilled over again, in order to be rectified into alcohol, or, as we uſually call it, ſpirits of wine, if the fire be raiſed at the time when the faints begin to fall off, a very conſiderable quantity of oil will be raiſed by it, and will run in the viſible form of oil from the noſe of the worm. This is not peculiar to malt ſpirit; but the French brandy ſhows the ſame phenomenon, and that in ſo great a degree, that half an ounce of this oil may be obtained from a ſingle piece of brandy.

Malt ſpirit, more than any other kind, requires to be brought into the form of alcohol before it can be uſed internally, eſpecially as it is now commonly made up in the retail [illegible], with ſo much of this groſs oil, and viſcous oil as will give it a good [illegible]. For this reaſon it ought to be reduced to an alcohol, or to [illegible] inflammable ſpirit, before [illegible] into any of the medicinal compoſitions. If it be uſed without this previous caution, the taſte of the malt oil [illegible] be diſtinguiſhed among all the other flavours of the ingredients.

A pure ſpirit being thus procured, ſhould be kept carefully in veſſels of glaſs or ſtone, well ſtopped, to prevent the evaporation of any of its volatile parts. If preſerved in caſks, it is apt to impregnate itſelf very ſtrongly with the wood. The quantity of pure alcohol obtainable from a certain quantity of malt, differs according to the goodneſs of the ſubject, the manner of the operation, the ſeaſon of the year, and the ſkilfulneſs of the workmen; according to which variations, a quarter of malt will afford from eight or nine to 13 or 14 gallons of alcohol. This ſhould encourage the malt diſtiller to be careful and diligent in his buſineſs, as ſo very large a part of his profit depends wholly on the well-conducting his proceſſes.

After every operation in this buſineſs, there remains a quantity of faints, which in their own coarſe ſtate ought never to be admitted into the pure ſpirit; theſe are to be ſaved together, and large quantities of them at once wrought into alcohol. It is eaſy to reduce theſe to ſuch a ſtate that they will ſerve for lamp-ſpirits. Their diſagreeable flavour being corrected by the adding of aromatics during the diſtillations, the reducing them into a perfect and pure alcohol is practicable, but not without ſuch difficulties as render it ſcarcely worth the trader's while. One way of doing it is by diſtilling them from water into water, and that with a very ſlow fire. By this means a pure alcohol may be made out of the fouleſt faints.

The malt diſtiller always gives his ſpirit a ſingle rectification *per ſe*, in order to purify it a little, and make it up proof; but in this ſtate it is not to be reckoned fit for internal uſes, but ſerves to be diſtilled into geneva and other ordinary compound ſtrong waters for the vulgar.

The Dutch who carry on a great trade with malt ſpirit, never give it any farther rectification than this; and it is on this account that the malt ſpirit of England is in general ſo much more in eſteem. The Dutch method is only to diſtil the waſh into low wines, and then to full proof ſpirit; they then directly make it into geneva, or elſe ſend it as it is to Germany, Guinea, and the Eaſt Indies, for the Dutch have little notion of our rectification. Their ſpirit is by this means rendered very foul and coarſe, and is rendered yet more nauſeous by the immoderate uſe they make of rye meal. Malt ſpirit, in its unrectified ſtate, is uſually found to have the common bubble proof, as the malt diſtiller knows that it will not be marketable without it.

The whole matter requiſite to this is, that it have a conſiderable portion of the groſs oil of the malt well broke and mixed along with it; this gives the rectifier a great deal of trouble if he will have the ſpirit fine; but in the general run of the buſineſs, the rectifier does not take out this oil, but breaks it finer, and mixes it faſter in by alkaline ſalts, and diſguiſes its taſte by the addition of certain flavouring ingredients. The ſpirit loſes in theſe proceſſes the vinoſity it had when it came out of the hands of the malt diſtiller, and is in all reſpects worſe, except in the diſguiſe of a mixed flavour.

The alkaline ſalts uſed by the rectifier deſtroying the natural vinoſity of the ſpirit, it is neceſſary to add an extraneous acid in order to give it a new one. The acid they generally uſe is the ſpiritus nitri dulcis; and the common way of uſing it is the mixing it to the taſte with the rectified ſpirit: this gives our malt ſpirit, when well rectified, a flavour ſomewhat like that of French brandy, but this ſoon flies off; and the better method is to add a proper quantity of Glauber's ſtrong ſpirit of nitre to the ſpirit in the ſtill. The liquor in this caſe comes over impregnated with it, and the acid being more intimately mixed, the flavour is retained.

Malt-Bruiſer, or *Bruiſing-mill*. It has been found by repeated experiments, that bruiſing malt is a more advantageous method than the old one of grinding and flouring. By bruiſing, there is not only leſs waſte, but the malt is alſo better fitted for giving out all its virtues. It has therefore become a practice to ſqueeze malt between rollers, by means of a proper apparatus, of which various conſtructions have been invented. One of the beſt contrivances of this ſort is ſaid to be the bruiſing-mill of Mr Winlaw, which conſiſts of a frame, a large cylinder or roller, a ſmall roller, a hopper, a ſhoe, a frame to ſupport the hopper, a fly wheel, and a windlas. To uſe this engine, it is directed to ſcrew the large roller up to the ſmall one, and not to feed too faſt from the ſhoe, which is regulated by pins that have ſtrings fixed to them. It is evident, that when two ſmooth ſurfaces are oppoſed to each other at a diſtance which can be regulated at pleaſure, neither grain nor any other ſimilar ſubſtance can paſs between them without being bruiſed. This being the principle on which the bruiſing-mill acts, the meally ſubſtance, which is the eſſential part of malt, is entirely removed from the ſkin or huſk which contains it, and all the virtues of the malt are with eaſe extracted by the water in a manner ſuperior to what is effected when the grain is only cut by grinding. The operation is at the ſame time ſo expeditiouſly performed, that two men can with eaſe bruiſe a buſhel of malt in a minute. By the ſame engine may alſo be bruiſed oats and beans for horſes. A great part of the corn given theſe animals, it is well known, is ſwallowed whole, and often paſſes through them in the ſame ſtate; in which caſe, they cannot receive any nouriſhment from the grains that are unbroken; but when bruiſed in this engine, it eaſes maſtication; and every grain being prepared for nutrition, a much leſs quantity will of courſe be found to be ſufficient. For bruiſing beans, the two regulating ſcrews muſt be unſcrewed a little; and the fly-wheel requires to be then ſet in motion with the hand, on account that the rollers are then a little ſpace apart, and will not turn each other before the beans come between them.

Malt-Tax, is the ſum of 750,000l. raiſed every year by parliament ſince 1697, by a duty of 6d. on the buſhel of malt, and a proportionable ſum on certain liquors, ſuch as cyder and perry, which might otherwiſe prevent the conſumption of malt. This is under the management of the commiſſioners of the exciſe; and is indeed itſelf no other than the annual exciſe. In 1760, an additional perpetual exciſe of 3d. per buſhel was laid upon malt; and in 1763, a proportional exciſe was laid upon cyder and perry, but new-modelled in 1766. See Excise.

MALTA, a celebrated iſland of the Mediterranean, ſituated between the 15th and 16th degrees of eaſt longitude, and between the 35th and 36th degrees of north latitude. It is about 19 or 20 miles in length, nine or ten in breadth, and 60 in circumference. Anciently it was called *Melita;* and is ſuppoſed by Cluverius, from its ſituation and other particulars, to be the Hyperia mentioned by Homer, whence the Phæaces were afterwards driven by the Phenicians, and retired into Scheria and the iſland of Corfu; which is the more probable, as the ancient poet places the mountain Melita in that iſland. He has likewiſe brought ſome probable arguments to prove, that Melita or Malta is the ancient *Ogygia;* in which the famed nymph *Calypſo*, daughter of the Ocean and Thetis, received the ſhipwrecked Ulyſſes, and detained him ſeven years.

1
Ancient hiſtory of the iſland.

The moſt ancient poſſeſſors of Malta, of whom we have any certain account, were the Carthaginians; from whom it was taken by the Romans: and yet during the whole time that it continued under the power of theſe polite nations it was almoſt entirely barren. The ſoil was partly ſandy and partly rocky, having ſcarcely any depth of earth; and withal ſo ſtony, that it was hardly capable of producing corn or any other grain except cummin, and ſome ſeeds of a ſimilar nature. Its chief products were figs, melons, honey, cotton, and ſome few other fruits and commodities, which the inhabitants exchanged for corn; and in this barren ſtate it ſeems to have continued till it came into the poſſeſſion of the Malteſe knights. It laboured alſo under great ſcarcity of water and fuel: upon all which accounts it was till that time but thinly inhabited, there being only about 30 or 40 boroughs or other villages ſcattered about, and no city except the capital, called alſo *Malta*, and the town and fort of St Angelo, which defended the harbour: ſo that the whole number of its inhabitants did not exceed 12,000, including women and children; the greateſt part of whom were very indigent.

According to an ancient tradition, Malta was firſt poſſeſſed by an African prince named *Battus*, an enemy to Queen Dido; from whom it was taken by the Carthaginians; from the Carthaginians it paſſed to the Romans, who made themſelves maſters of it when they ſubdued the iſland of Sicily. Theſe were driven out by the Arabs in the year 828; who were driven out in their turn by Roger the Norman, earl of Sicily, who took poſſeſſion of it in 1190: from which time it continued under the dominion of the Sicilian princes till the time of Charles V. when it fell under his power, along with Naples and Sicily. To cover the iſland of Sicily from the Turks, Charles gave the iſland to the *knights of Rhodes*, ſince that time called *knights of Malta*, whoſe origin and hiſtory is given under the article *Knights of Malta* and *Rhodes*.

2
Malta given to the knights of Rhodes.

At the firſt landing of the Malteſe knights, they found themſelves obliged to lodge in a very poor town at the foot of the hill on which ſtands the caſtle of St Angelo, and where their only habitations were fiſhermen's huts. The grand maſter, with the principal knights, took poſſeſſion of the caſtle, where the accommodations were ſomewhat better; though theſe too were very mean, and out of repair. Three days after, he took poſſeſſion of the city, which was formerly called *Malta*, but ſince that time hath taken the name of the *Notable City;* and after that, of the whole iſland of Malta, and the neighbouring one of Goſa.

The firſt care of the knights, after having ſettled their authority through the two iſlands, was to provide ſome better accommodation for the preſent, and to chooſe a proper place where to fix their habitation. But as the iſland had no other defence than the old caſtle of St Angelo, and was ſo much expoſed on all ſides, that it would have required greater ſums than their exhauſted treaſury could ſpare to put it in a proper ſtate of defence; the grand maſter was obliged to content himſelf with ſurrounding the borough above mentioned, wherein he had ordered new buildings to be reared for the preſent habitation of his knights, with a ſtout wall, to prevent its being ſurpriſed by the Turkiſh and Barbary corſairs. His deſign, indeed, at this time, was not to have fixed the abode of the knights in the bare and defenceleſs iſland of Malta, but to ſtay in it only till he had got a ſufficient force to attempt the conqueſt of *Modon*, a town of the Morea, and which was not only a populous and opulent place, but lay very convenient for making an attempt on the iſland of Rhodes, their ancient habitation, and to which they were naturally attached. This, however, did not hinder his taking all proper meaſures for ſecuring Malta as well as Goſa, and laying out a proper plan for ſecuring them from attacks, in caſe the deſign on Modon ſhould fail.

3
They attempt the conqueſt of Modon without ſucceſs.

In the mean time, as ſuperſtition was then univerſally prevalent, the grand maſter, among other precious relics which they had brought from Rhodes, cauſed the arm of St Catharine to be carried in proceſſion to the cathedral. Whilſt they were on their march, one of the centinels gave them notice, that a large Turkiſh merchantman was wrecked on their coaſt. The grand maſter immediately deſpatched ſome of his knights and ſoldiers thither; who finding Iſaac the patron of the ſhip, a native of Modon, and one Maurithiſala Nocher, an excellent engineer, they were retained in the ſervice of the order, and the latter was immediately employed in fortifying the iſland.

The knights were hardly ſettled in Malta, when the emperor, and other European potentates, endeavoured to engage them in a war with the inhabitants of Barbary, as the city of Tripoli, then held by Charles, was in great danger of falling into the hands of the infidels. The attempt on Modon, however, was firſt made; but it proved unſucceſsful, through the baſe avarice of the Malteſe forces: for they having been admitted into the city, during the night began to murder and plunder the inhabitants, without waiting for the arrival of the galleys which were coming to their aſſiſtance. The conſequence was, that the inhabitants armed, and a deſperate battle began; in which the Malteſe, notwithſtanding the utmoſt efforts, were obliged to retire, but not till they had loaded themſelves with plunder, and carried away 800 women captive.

4
Join the

The grand maſter, looking upon this diſappointment as a ſign that Providence had ordained Malta to be the reſidence of the knights, did not renew his attempts upon Modon: but, in 1532, joined with the emperor againſt the Turks, and ſent a great number of his galleys to join the confederate fleet under the celebrated Andrew Doria. In conſequence of this aid, the confederates proved ſucceſsful; and in all probability the conqueſt of Modon would have been accompliſhed, had not the ſoldiers, encouraged by the bad ſucceſs of the laſt attempt, openly refuſed to proceed, and obliged the emperor to proceed to Coron, another town belonging to the Turks. Through the valour of the Malteſe knights, this place was ſoon obliged to capitulate; and in a ſecond expedition in 1533, the knights again diſtinguiſhed themſelves in a moſt eminent manner. They were quickly recalled, however, by the grand maſter to the defence of the iſland, which was now threatened with an invaſion by Barbaroſſa the celebrated Turkiſh corſair, who ſcoured thoſe ſeas at the head of above fourſcore galleys. This invaſion, however, did not take place; and in 1534 the grand maſter Villiers de l'Iſle Adam died, and was ſucceeded by Perino de Ponte, a native of the town of Aſt in Italy.

The new grand maſter, who received intelligence of his election at St Euphemia in Calabria, very ſoon after received another expreſs, giving an account of the wars which at that time reigned in Tunis, and the danger that Tripoli as well as Malta was in from Barbaroſſa, who was by this time become maſter both of Algiers and Tunis; upon which he made all the haſte he could to his new government. His firſt care was to ſend a ſtrong reinforcement to Italy; after which, he deſpatched an embaſſy to the emperor, intreating him to equip a powerful fleet againſt Barbaroſſa, without which it would be impoſſible for Tripoli to hold out much longer.

5 Africa invaded by Charles.

By this embaſſy from De Ponte, and another to the ſame purpoſe from Muley Haſſen, the depoſed king of Tunis, Charles was eaſily prevailed on to carry his arms into Africa; in which he was aſſiſted by a great number of the braveſt knights, together with 18 brigantines of different ſizes, four of the beſt Malteſe galleys, and their veſſel called the *great carrack*, of itſelf almoſt equivalent to a ſquadron. In this expedition the knights diſtinguiſhed themſelves in a moſt eminent manner. At the ſiege of Goletta, one of the knights, named [illegible], an excellent engineer, by means of a *barca longa*, got almoſt cloſe to the great tower, which he furiouſly battered with large cannon, while the great carrack, which was behind all the reſt of the veſſels, and by reaſon of its height could fire over them, did prodigious execution. A breach was ſoon made; and hardly was it wide enough to be ſcaled, when the Malteſe knights jumped out of the galleys into their long-boats: and thence into the ſea, with their ſwords in their hands, and waded through the water above their girdles, it being too ſhallow for boats to approach the ſhore. The ſtandard-bearer of the order was the firſt that jumped into the water, and led the reſt to the attack; they claiming everywhere the poſt of honour. They marched with the greateſt reſolution through the moſt terrible firing and ſhowers of all kinds of miſſile weapons; and, having gained the ſhore, quickly aſcended the breach, on the top of which they planted their great ſtandard. A great number loſt their lives, and ſcarcely one came off unwounded; but the emperor did them the juſtice to own, that the taking the place was chiefly owing to the valour of the Malteſe knights.

6 Deſperate valour of the Malteſe knights.

The city of Tunis was ſoon taken after the fortreſs of Goletta: on the ſurrender of which, the emperor, deſigning to return into Europe, took his laſt dinner on board the great carrack: where he was magnificently entertained, and beſtowed on the ſurviving knights the greateſt encomiums, and marks of his eſteem and gratitude to the owner. Theſe he accompanied with conſiderable preſents and with two new grants. By the firſt, they were allowed to import corn and other proviſions from Sicily, without paying duty; and by the ſecond, the emperor engaged, that none of the order ſhould enjoy any of the eſtates or revenues, due to Malteſe knights, throughout all his dominions, unleſs they were lawfully authorized by the grand maſter and his council; or till the originals had been examined and regiſtered by himſelf, or ſuch miniſters as he ſhould appoint for that purpoſe. The fleet then ſet ſail for Malta; where, on their arrival, they received the news of the grand maſter's death, who was ſucceeded by Didier de Tolon de St Jalle, a native of Provence, and then grand prior of Thoulouſe, where he reſided at the time of his election.

7 Privileges conferred upon them by the emperor.

The preſent grand maſter was a man of great conduct and bravery, which he had formerly ſhown at the ſiege of Rhodes; and the ſituation of affairs at this time required a perſon of experience. The Turkiſh corſairs, quite tired out with the dreadful havock made among them by Botigella, grand prior of Piſa, who ſeldom quitted the ſea, and never failed out without ſinking ſome of them, or making conſiderable prizes, had agreed to enter into a ſtrong confederacy, either to ſurpriſe the city of Tripoli where his retreat was, or, if that failed, to lay ſiege to it by ſea and land; in either of which attempts, they were ſure of all the aſſiſtance of Barbaroſſa and Hayradin, then lord of Tangiers. This laſt had undertaken the command and conduct of the whole enterpriſe; but the governor being informed of the deſign, prepared to give him a warm reception. Hayradin came thither with his whole force in the dead of the night, and began to ſcale the walls in thoſe places where he reckoned them to be moſt defenceleſs. They no ſooner appeared at the foot of them, than the garriſon, which had been kept up in arms, poured down ſuch ſtreams of wildfire, boiling oil, melted lead, &c. and threw ſuch volleys of ſtones, while the great and ſmall guns ſo annoyed thoſe that ſtood fartheſt off, that great numbers of them were deſtroyed. They perſiſted in the attack, however, with great fury and vigour, till Hayradin, who was foremoſt in one of the ſcalades, was knocked down by a muſket-ſhot from the top of his ladder. He fell into the ditch, and was taken up almoſt dead; upon which his troops inſtantly diſperſed themſelves, and abandoned the enterpriſe. The governor of Tripoli, however, judging that this would not be the laſt viſit of the kind which in all probability he would receive, immediately deſpatched an expreſs to Malta, with propoſals for fortifying the city, and demoliſhing a ſtrong tower on that coaſt named *Alcaid*, which was held by a Turkiſh corſair. His advice being approved of, the commander Botigella, now general of the galleys, was immediately deſpatched with a ſufficient force; who, having landed his men at Tripoli, immediately marched with them and a body of Arab mercenaries towards Alcaid; and without ſtaying to open the trenches, or any other covering than his gabions, levelled his artillery againſt it. Hayradin being informed of this,

8 The Turks make an unſucceſsful attempt on Tripoli.

Malta.

came with his Turks to its defence; but was intercepted by a ſtrong detachment of Malteſe knights at the head of the hired Arabs, and repulſed with loſs; ſo that all he could do was to convey about 50 or 60 Turks into the place, and to annoy the Chriſtians with ſome ſlight ſkirmiſhes. Botigella, perceiving that his cannon did not make ſuch quick deſpatch as he wiſhed, ſent ſome of his galleys; under the ſhelter of which he quickly ſprung a mine, which brought down part of the wall, and buried moſt of the corſairs under it; upon which the reſt, ſeeing the Malteſe knights mount the breach ſword-in-hand, immediately threw down their arms. The tower was then razed to the ground; after which Botigella marched to a town called *Adabus*, whence he drove Hayradin, who had intrenched himſelf in it, and gave the plunder to the Arabs. In his return he attacked and took a large Turkiſh galley, the cargo of which was valued at 160,000 crowns, and had on board 200 perſons; ſo that he landed in triumph, and was received with the loud acclamations of the whole order, who came to meet him on his arrival. Soon after the grand maſter fell ſick and died, and was ſucceeded by John de Homedes.

Freſh complaints having in 1564 been made to Soliman, he propoſed, in a grand council where moſt of his officers attended, to extirpate the knights altogether. This deſign was ſtrenuouſly oppoſed by Hali, one of Dragut's moſt experienced captains, who offered the moſt ſolid reaſons againſt it; but being overruled by the reſt, an expedition againſt Malta was reſolved upon. One of the ſultan's firſt cares was to ſend ſome ſpies, in the diſguiſe of fiſhermen, to take a full view of the iſland, who found means to bring him an exact plan of it, with all its fortifications, havens, ſtrength, the number of its inhabitants, &c. whilſt he was haſtening his armaments againſt it. By this time, as the Malteſe had very little reaſon to doubt that the Turkiſh armaments were deſigned againſt their iſland, the viceroy of Sicily, Don Garcia, was ordered by his maſter to take it in his way to the caſtle of Goletta, in order to conſult with the grand maſter about the neceſſary means for oppoſing ſuch a formidable power. The grand maſter acquainted him, that, in caſe of an attack upon Malta, he ſhould want both men and corn: upon which the viceroy engaged to ſupply him with both on his return to Sicily; in pledge of which he left one of his ſons with him, who was afterwards admitted into the order. He was no ſooner departed, than the grand maſter ſummoned all the knights of the order, diſperſed through ſeveral parts of Europe, to repair to him. Thoſe that were in Italy raiſed a body of 2000 foot, to which the viceroy of Sicily added two companies of Spaniſh forces. All the galleys of the order were employed in tranſporting theſe troops, together with all manner of proviſions and ammunition, into the iſland; and the knights that were in it, in diſtributing, diſciplining, and exerciſing their new levies, as well as the Malteſe militia, againſt the ſiege. Thus the grand maſter ſaw himſelf ſtrengthened by the arrival of 600 knights, all of whom brought with them retinues of ſtout good ſervants, fit to aſſiſt in the defence of the iſland; whilſt thoſe, who by reaſon of age, ſickneſs, or other impediments, could not repair to him, ſold their moſt valuable effects in order to aſſiſt him with their purſes. The pope, on his part, contented himſelf with ſending a ſupply of 10,000 crowns; and the king of Spain ordered his viceroy Don Garcia to raiſe an army of 20,000 men, to be ready to ſail whenever he was called for. The grand maſter employed the remainder of his time in viſiting all the forts, magazines, arſenals, &c. and aſſigning to each tongue their ſeveral poſts, and making all neceſſary preparations, till the Ottoman fleet appeared in ſight on the 18th of May 1565. It conſiſted of 159 large galleys and galleaſſes, carrying on board 30,000 land forces, janizaries and ſpahis, beſides the ſlaves at the oar, accompanied by a conſiderable number of other veſſels, laden with artillery, ammunition, and other neceſſaries for a ſiege. The whole armament was commanded by Muſtapha Baſha, an old experienced officer, aged about 85 years, and an old favourite and confidant of the ſultan; of a haughty cruel temper, who made it a merit to violate his word, and to uſe all manner of violence againſt the Chriſtians, eſpecially againſt the Malteſe. This formidable army landed at ſome diſtance from Il Borgo, and ſoon afterwards ſpread themſelves over the country; ſetting fire to the villages, putting the peaſants to the ſword, and carrying off ſuch of the cattle as, notwithſtanding the orders of the grand maſter, had not been ſecured within the forts and towns.

Malta.

The ſiege commenced.

While the Turks were thus employed, La Valette (the grand maſter) ſent out De Copier, marſhal of the order, with 200 horſe and 600 foot, to watch their motions. De Copier, an officer of great experience, executed his commiſſion with ſo much prudence and vigour, that, by falling unexpectedly on detached parties, he cut off 1500 Turks, with the loſs only of 80 men.

The Turkiſh general held a council of war as ſoon as all his troops were landed, to aſſiſt him in reſolving where he ſhould begin his attack. Piali, the Turkiſh admiral, agreeably to what he underſtood to have been the ſultan's inſtruction, was of opinion that they ought not to enter upon action till Dragut ſhould arrive. But Muſtapha having received information of the king of Spain's preparations, thought ſomething ought to be done inſtantly for the ſafety of the fleet; which lay at preſent in a creek, where it was expoſed to the violence of the eaſt wind, and might be attacked with great advantage by the Spaniards. On this account he was of opinion, that they ſhould immediately lay ſiege to a fort called *St Elmo*, which ſtood on a neck of land near Il Borgo, having the principal harbour on one ſide of it, and on the other another harbour large enough to contain the whole fleet in ſafety. This propoſal was approved by a majority of the council, and Muſtapha proceeded without delay to carry it into execution.

12
Deſperate defence of St Elmo.

La Valette did not expect that a place which was neither ſtrong nor large enough to admit a numerous garriſon, could be defended long againſt ſo great a force as was employed to reduce it; yet he thought it neceſſary that the ſiege of this fort ſhould be protracted as long as poſſible, in order to give the viceroy of Sicily time to come to his relief. With this view, he reſolved to throw himſelf into St Elmo, with a choſen body of troops; and he was preparing to ſet out, when the whole body of knights remonſtrated with ſuch earneſt importunity againſt his leaving the town, that he at laſt conſented to ſuffer the reinforcement, which he had prepared, to be conducted to the fort by a knight called *De Medran*, upon whoſe conduct and intrepidity he could rely with the moſt aſſured confidence.

Not long after De Medran's arrival in the fort, the garriſon made a vigorous ſally, in which they drove the enemy from their intrenchments, and put a number of them to the ſword. But the reſt ſoon recovered from their ſurpriſe; and having returned to the charge, they compelled the Chriſtians to retire. In this rencounter, the vigorous efforts of the janizaries were favoured by the wind, which blew the ſmoke of the guns upon the fort, and covered the beſieged with a thick cloud, through which it was impoſſible to diſcern the operations of the enemy. This incident the Turks had the preſence of mind to improve to very great advantage. They ſeized, unperceived, upon the counterſcarp; made a lodgment there with beams, woolſacks, and gabions; and raiſed a battery upon it with incredible expedition. After the ſmoke was diſperſed, the beſieged beheld what had been done with much aſtoniſhment: and they were the more diſquieted, as the fortification which the Turks had raiſed upon their counterſcarp overtopped a ravelin which lay near it, in which the beſieged could no longer appear with ſafety. They reſolved, however, to defend this ravelin as long as poſſible, whatever it ſhould coſt them.

In the mean time Dragut, and another noted corſair named Uluchiali, arrived with 20 galleys; having, beſides ſlaves and ſeamen, 2500 troops on board. This reinforcement, and the preſence of Dragut, added freſh vigour to the operations of the ſiege. This gallant corſair expoſed himſelf, on all occaſions, with the utmoſt intrepidity; ſpent whole days in the trenches; and as, beſides his other extraordinary talents, he was particularly ſkilful in the management of artillery, he cauſed ſome new batteries to be raiſed in more advantageous ſituations than had hitherto been made choice of; and kept up a continual fire both on the ravelin above mentioned, and a cavalier that covered the fort and was one of its principal defences.

This cavalier ſoon became the only defence which could prevent the beſiegers from coming up to the very foot of the wall. Some Turkiſh engineers having approached the ravelin at daybreak, to obſerve the effects of their artillery, they perceived a gun port ſo low, that one of them, when mounted on the ſhoulders of another, looked into it, and ſaw the Chriſtian ſoldiers lying on the ground aſleep. Of this they gave immediate information to the troops; who, advancing as quickly and ſilently as poſſible, and clapping ladders to the gun-hole, got up into the ravelin, and cut moſt of the Chriſtians to pieces.

Between this ravelin and the cavalier lay the ditch, over which the beſieged had thrown a temporary bridge of planks leading up to the cavalier. The Turks, perceiving this, leaped inſtantly upon the bridge, and attempted to make themſelves maſters of the cavalier, as they already were of the ravelin. But the garriſon was now alarmed; the braveſt of the knights haſtened from different quarters to the poſt of danger; and after an obſtinate engagement, they compelled the Turks to retire into the ravelin. These, diſcovering another way of reaching the cavalier by a path from the bottom of the ditch, they threw themſelves down without dread or heſitation; and having aſcended by this path to the other ſide, they renewed their attack with greater fury than ever. The combat laſted from ſunriſe till noon, when the knights at laſt proved victorious. About 20 knights and 100 ſoldiers were killed; and near 3000 of the enemy.

As the ravelin was open on the ſide towards the fort, the beſieged pointed ſome cannon againſt it, and made great havock among the infidels. But Muſtapha, ſenſible of the value of the acquiſition he had made, poured in freſh ſoldiers without number, and the pioneers coming forward with woolſacks, planks, and gabions, put the troops, at length in ſafety, and made a lodgment in the ravelin, of which the garriſon were never afterwards able to diſpoſſeſs them.

The grand maſter's concern on account of this diſaſter was greatly augmented, by conſidering, that it could not have happened ſo ſoon without ſome negligence on the part of the garriſon. He ſent them, however, an immediate reinforcement; and both the ſiege and the defence were carried on with the ſame vigour as before.*

But the ſituation of the beſieged was now become much more dangerous than formerly. The Turks applied with unremitting diligence to heighten the ravelin till it overtopped the wall of the fort; and after this the garriſon could no longer appear upon the parapet with ſafety. Many were killed by the enemy's artillery, ſeveral breaches were made in the wall, and the hearts of the braveſt knights began to fail within them.

11
The knights deſire permiſſion to leave the fort, but are refuſed.

They agreed therefore, though with much reluctance, to apply to the grand maſter for liberty to quit the fort; and they made choice of the Chevalier de Medran for their meſſenger. He repreſented that the fort was in reality no longer tenable; and that, to continue in it, though only for a few days, would infallibly occaſion the deſtruction of the garriſon.

Moſt of the knights in council thought that this requeſt of the garriſon ought to be immediately granted. But La Valette was of a contrary opinion.—This he repreſented to the Chevalier de Medran; and ſent him back with inſtructions to remind the knights of the vows which they took at their entrance into the order, of ſacrificing their lives for its defence. He likewiſe bade him aſſure them, in his name, that he would not fail to ſend them ſuch reinforcements as they ſhould ſtand in need of; and was determined, as ſoon as it ſhould be neceſſary, to come himſelf to their aſſiſtance, with a fixed unalterable purpoſe to lay down his life ſooner than deliver the fort into the hands of the infidels.

This anſwer had the deſired effect on ſeveral of the knights, and particularly on thoſe whoſe principles of honour and attachment to the order were confirmed by years. But the greater part of them were much diſſatisfied. They thought the grand maſter's treatment of them harſh and cruel; and wrote him a letter, ſubſcribed by 53; in which they informed him, that if he did not, on the next night, ſend boats to carry them to the town, they were determined to ſally out into the Turkiſh camp, where they might fall honourably by the ſword, inſtead of ſuffering ſuch an ignominious death as they had reaſon to expect if the fort was taken by them.

To this letter La Valette replied, "That they were much miſtaken if they expected to ſatisfy their honour by throwing away their lives; ſince it was no leſs their duty to ſubmit to his authority than to ſacrifice their lives in defence of the order: that the preſervation of the whole depended on their preſent obedience to his commands: that no aid was to be expected from Spain if the fort were given up. And that if he ſhould yield to their requeſt, and bring them to the town, the town itſelf would then be immediately inveſted; and they, as well as the reſt, ſoon afterwards reduced to a ſituation more deſperate than that from which they were ſo ſolicitous to eſcape, by deſerting an important poſt which they had undertaken to defend." Beſides this letter, he ſent three commiſſioners to examine the ſtate of the fortifications; intending by this meaſure either to gain time or to prevent the garriſon from ſinking into deſpair.

Theſe commiſſioners differed very widely in the accounts which they delivered at their return. Two of them thought it impoſſible to defend the fort much longer. But the third, named Conſtantine Caſtriot, a Greek prince, deſcended from the famous Albanian hero Scanderbeg, whether from ignorance or a conſciouſneſs of greater reſources in his native courage than the other two poſſeſſed, maintained that the garriſon was far from being reduced to the laſt extremity; and to give a proof how firmly he was perſuaded of the truth of what he ſaid, he offered to enter the fort himſelf, and to undertake the defence of it with ſuch troops as ſhould be willing to accompany him.

The grand maſter, ſtrongly impreſſed with a ſenſe of the neceſſity of protracting the ſiege, immediately accepted this offer, and beſtowed the higheſt encomiums on Caſtriot's zeal and reſolution. Nor did Caſtriot find any difficulty in perſuading a ſufficient number to attend him, who were no leſs zealous and reſolute than himſelf. The ſoldiers crowded to his ſtandard, and were emulous to have their names enrolled for that dangerous ſervice in which he had engaged.

When La Valette ſaw the ſpirit by which theſe men were animated, and had no longer any doubt of being able by their means to prolong the ſiege of the fort; he ſent a letter to the knights, acquainting them, that he was now willing to give them their diſcharge; and would immediately ſend another garriſon, into whoſe hands he deſired they ſhould be ready to deliver up the fort, and come themſelves to the town in the boats in which their ſucceſſors were to be tranſported.

The contents and ſtyle of this letter affected the knights in the moſt ſenſible manner, and rouſed within them that delicate ſenſe of honour by which the order had been ſo long and ſo eminently diſtinguiſhed. —They reſolved without heſitation to remain in the fort till every man ſhould periſh, rather than either deliver it to the new garriſon or abandon it to the enemy. And they went in a body to the governor, and intreated him to inform the grand maſter of their repentance, and to join with them in praying that they might be ſuffered to wipe out the remembrance of their fault by their future conduct.

The grand maſter ſuffered himſelf at laſt to be overcome; and henceforth the garriſon were intent on nothing but how to prolong the defence.

12 Invention of burning-hoops.

The grand maſter ſent them every night freſh troops to ſupply the place of the killed and wounded; and kept them well furniſhed with proviſions, ammunition, and fire-works. Of theſe laſt he had invented a particular kind, which conſiſted of hoops of wood, covered with wool, and ſteeped in boiling oil and other inflammable liquors, mixed with nitre and gunpowder. To theſe machines they ſet fire, and threw them flaming in the midſt of the enemy when they were crowded together at an aſſault. It happened often that two or three of the Turks were hooked together and ſcorched to death; and the utmoſt confuſion was produced wherever they were thrown.

The beſieged ſtood much in need of this, and every other inſtrument of miſchief that could be deviſed, for their defence. In ſpite of the moſt vigorous oppoſition, the Turks had caſt a bridge over the ditch, and begun to ſap and undermine the wall. From the 17th of June to the 14th of July, not a ſingle day paſſed without ſome rencounter; and Muſtapha had frequently attempted to ſcale the wall of the fort, but had been as often repulſed with the loſs of ſome of the braveſt of his troops.

Aſhamed at having been detained ſo long before a place of ſuch inconſiderable ſtrength, he reſolved to make one great deciſive effort; and to bring to the aſſault as many of his forces as the ſituation of the place would permit him to employ. He had already made ſeveral breaches; but in order to ſecure the ſucceſs of the aſſault which he now intended, he kept his batteries playing all the 15th without intermiſſion, till the wall on that ſide where he deſigned his attack was almoſt level with the rock. On the 16th, the fleet was drawn up before ſunriſe, as near the fort as the depth of the water would allow. Four thouſand muſketeers and archers were ſtationed in the trenches; and the reſt of the troops, upon a ſignal given, advanced to the breach. The garriſon was prepared to receive them; the breach was lined with ſeveral ranks of ſoldiers, having the knights interſperſed among them at certain diſtances. The Turks attempted often to break through this determined band, and to overpower them with their numbers; but their numbers ſerved only to augment the loſs which they ſuſtained. Every ſhot from the fort did execution. The artillery made dreadful havock among them: and the burning hoops were employed with aſtoniſhing ſucceſs. The novelty of theſe machines, and the ſhrieks of thoſe who were caught in them, added greatly to the terror which they inſpired; and made it impoſſible for the Turkiſh officers to keep their men firm and ſteady in purſuing the advantages, which, had they preſerved their ranks, their numbers muſt have infallibly acquired.

At length Muſtapha, after a fruitleſs aſſault of more than ſix hours, gave orders for ſounding a retreat. In this attack the garriſon loſt about 20 knights and 300 ſoldiers; but this loſs was immediately ſupplied by a reinforcement from the town; and Muſtapha was at laſt convinced, that, unleſs the communication between the fort and the town were cut off, it would be impoſſible to bring the ſiege of the former to a period, while any troops remained in the other parts of the iſland. By the advice of Dragut, he reſolved to extend his trenches and batteries on the ſide next the town, till they ſhould reach to that part of the ſea, or great harbour, where thoſe ſupplies were landed which the grand maſter daily ſent to the garriſon. This undertaking he knew muſt be attended with the utmoſt difficulty, becauſe all the ſpace between his intrenchments, and the point to which it was neceſſary to extend them, lay expoſed to the artillery both of Fort St Elmo and St Angelo. In viewing the ground, a Sangiac, in whom he put confidence, was killed by his ſide; and, which was ſtill a more irreparable loſs, Dragut received a mortal wound, of which he died in a few days. This did not, however, diſcourage Muſtapha from purſuing his deſign. By employing his troops and pioneers at the work day and night, without intermiſſion, he at length carried it into execution. Then having planted batteries along the ſhore, and filled his trenches with muſketeers, it was impoſſible for any boat to paſs from the town to the fort without the moſt imminent danger of either being ſunk or intercepted.

After this precaution, he renewed with freſh vigour his attempts to take the fort by ſtorm. On the 21ſt he made four different aſſaults; all of which the garriſon withſtood; and, in repulſing ſo many thouſand brave and well diſciplined troops, diſplayed a degree of proweſs and fortitude which almoſt exceeds belief, and is beyond the power of deſcription. But this heroic garriſon was now exceedingly reduced in number; and there was the ſtrongeſt reaſon to apprehend, that, in one aſſault more, they muſt inevitably be overpowered, unleſs a reinforcement were ſent them from the town. Of their deſperate ſituation they gave intelligence to the grand maſter by one who ſwam acroſs the harbour in the night. The boats were inſtantly filled with knights and other ſoldiers, who generouſly reſolved to devote themſelves to certain deſtruction for the general ſafety, and the preſervation of the fort. They ſet off from the town with as much alacrity as if they had entertained the moſt ſanguine hopes of victory; but they found the Turks everywhere ſo much upon their guard, and the lines ſo ſtrongly defended, that, after ſeveral fruitleſs attempts to land, they were at laſt obliged to return, depreſſed with ſorrow for the fate of their brave companions.

The garriſon now gave themſelves up for loſt; but inſtead of either capitulating or attempting to eſcape, they prepared for death, and paſſed the night in prayer and in receiving the ſacrament; after which they embraced one another tenderly, and then repaired to their reſpective poſts; while ſuch of the wounded as had been diſabled from walking, were, at their own earneſt deſire, carried to the ſide of the breach, where they waited, without diſmay, for the approach of the Turkiſh army.

Early in the morning of the 23d of July, the Turks advanced to the aſſault with loud ſhouts, as to certain victory, which they believed ſo ſmall a handful of men as now remained in the fort would not dare to diſpute with them. In this expectation they were diſappointed. The garriſon being reſolved on death, and deſperate ſoldiers, were more than men; and exerted a degree of proweſs and valour that filled their enemies with amazement. The combat laſted upwards of four hours, till not only every knight but every ſoldier had fallen, except two or three who had ſaved themſelves by ſwimming. The Turkiſh colours were then planted on the ramparts; and the fleet entered the harbour, which the fort commanded, in a kind of triumph. When Muſtapha took a view of the fort, and examined its ſize and fortifications, he could not refrain from ſaying, "What will not the father coſt us (meaning the town), when the ſon, who is ſo ſmall, has coſt ſo many thouſands of our braveſt troops?" But this reflection, far from exciting his admiration of that heroic fortitude which he had found ſo difficult to overcome, ſerved only to inſpire him with a brutal fury. He ordered all ſuch of the garriſon as were found lying on the breach alive to be ripped open, and their hearts torn out; and, as an inſult on the knights and their religion, he cauſed their dead bodies to be ſearched for, and large gaſhes to be made in them, in the form of a croſs; after which he tied them on planks, and threw them into the ſea, to be carried by the wind and tide to the town or Fort St Angelo.

13
The fort taken, and the garriſon cut off.

14
Cruelty of Muſtapha.

The grand maſter was at firſt melted into tears at this ſhocking ſpectacle; but his grief was ſoon converted into indignation and revenge: and theſe paſſions betrayed him into an action unworthy of the exalted character which he bore. In order to teach the baſha, as he pretended, to make war with leſs barbarity, he cauſed all the Turks whom he had taken priſoners to be maſſacred; and then putting their heads into his largeſt cannon, he ſhot them into the Turkiſh camp.

15
And of the grand maſter.

In the ſiege which has been related, the order loſt about 1500 men, including 130 of the braveſt knights.

Muſtapha vainly imagined, that, being intimidated by the fate of their companions, they would be now inclined to liſten to terms of capitulation: and in this hope, he ſent an officer with a white flag to one of the gates, attended by a Chriſtian ſlave deſigned to ſerve for his interpreter. The Turk was not allowed to enter within the town; but the Chriſtian was admitted, and was led through ſeveral ranks of ſoldiers under arms, by an officer, who, after ſhowing him all the fortifications of the place, deſired him to take particular notice of the depth and breadth of the ditch, and ſaid to him, "See there, the only ſpot we can afford your general; and there we hope ſoon to bury him and all his janizaries."

This inſulting ſpeech being reported by the ſlave, excited in the fiery mind of the baſha the higheſt degree of wrath and indignation, and made him reſolve to exert himſelf to the utmoſt in the proſecution of the ſiege. His troops, though greatly diminiſhed, were ſtill ſufficient to inveſt at once both the town and the fort of St Michael. He kept a conſtant fire on both; but he intended firſt to apply to the reduction of the latter, which he propoſed to attack both by land and water, at the extremity of the peninſula on which it ſtands. In order to accompliſh this deſign, it was neceſſary he ſhould have ſome ſhipping introduced into the harbour for tranſporting his forces. But the mouth of the harbour having been rendered inacceſſible by a great iron chain and the cannon of St Angelo, his deſign muſt have been relinquiſhed, if Piali had not ſuggeſted an expedient againſt which the grand maſter had not provided. This was, to make the Chriſtian ſlaves and the crews of the ſhips draw a number of boats, by the ſtrength of their arms, over the neck of land on which ſtood Fort St Elmo. Of this propoſal, which Muſtapha immediately adopted, information was carried to the grand maſter by a Turkiſh officer; who, being by birth a Greek, was touched ſuddenly with remorſe, and deſerted to the Chriſtians. In conſequence of this intelligence, La Valette ſet a great number of hands to work in framing a ſtacado along that part of the promontory where the Turks intended their attack; and at another part, where the depth of the water or the hardneſs of the bottom would not admit the ſtacado, he cauſed ſtrong intrenchments to be made upon the beach. Muſtapha, in the mean time, fired inceſſantly upon the fort, while the ſlaves and crews were employed in tranſporting the boats over land into the harbour. At length the baſha, judging that the number of boats which he had tranſported would be ſufficient, and that the breaches which his artillery had made were practicable, reſolved, without further delay, to make an attack both by ſea and land. He was the more confident of ſucceſs, as, ſince the taking of St Elmo, he had received a conſiderable reinforcement, by the arrival of Haſcem, ſon of Barbaroſſa, with 2500 ſelect ſoldiers, commonly called *the Bravoes of Algiers*. Haſcem, who poſſeſſed a conſiderable ſhare of his father's fire, and was ambitious to diſtinguiſh himſelf in the ſultan's ſervice, begged of Muſtapha to intruſt him with the aſſault of Fort St Michael; and vaunted, with his natural arrogance, that he would ſoon make himſelf maſter of it ſword-in-hand. The baſha, whether from an opinion of his valour, or an intention to make him learn at his own expence the folly of his preſumption, readily complied with his requeſt; and, having added 6000 men to his Algerines, he promiſed to ſupport him with the reſt of his army.

Haſcem divided his forces with Candeliſſa, an old corſair, his lieutenant; to whom he committed the attack by ſea, whilſt he reſerved that on the land-ſide to himſelf.

16
The Turks repulſed with great ſlaughter.

Candeliſſa having put his troops on board the boats, ſet out with drums beating, and hautboys and other muſical inſtruments playing, preceded by a boat filled with Mahometan prieſts, ſome of whom were employed in offering prayers to heaven for his ſucceſs, or in ſinging hymns; while others had books in their hands, out of which they read imprecations againſt the Chriſtians. Candeliſſa attempted firſt to break down the ſtacado which had been formed to obſtruct his landing; but finding it much ſtronger than he expected, and that, while he was employed in demoliſhing it, his troops muſt ſuffer greatly from the enemy's fire, he thought it would be eaſier to make a deſcent on that part of the ſhore which the grand maſter had ſtrengthened with intrenchments. At this important poſt, the Chriſtian troops were commanded by an ancient knight of the name of *Guimeran*. This experienced officer reſerved his fire till the Turks had advanced within a little diſtance of the ſhore, when, by a ſingle diſcharge, he killed about 400 men. This did not prevent the reſt from approaching. Candeliſſa puſhed forwards while the Chriſtians were loading their cannon, and landed at the head of his Algerines. But Guimeran having reſerved ſome cannon charged with grape ſhot, did dreadful execution among them after they had landed, and many of them began to fly to their boats: which Candeliſſa obſerving, he commanded the boats to be put off to a little diſtance from the ſhore. His troops, perceiving then that they muſt either die or conquer, took courage from deſpair, and advanced boldly to the intrenchment, with ladders for ſcaling it in one hand and their ſabres in the other. The combatants on both ſides diſplayed the moſt intrepid valour. Great numbers fell, and the ditch was choaked with blood, and with the bodies of the dead and wounded. The Turks at laſt, after an engagement of five hours, reached the top of the intrenchment, and there planted their enſigns. The knights, ſtung with ſhame on account of their retreat, returned with redoubled ardour. But they would probably have been overpowered by the ſuperior number of the enemy, had not the grand maſter ſent them a ſeaſonable reinforcement, under the admiral de Giou and the Chevalier de Quiney; who fell upon the Algerines and Turks with a degree of fury that ſtruck terror into Candeliſſa himſelf, who was noted for his intrepidity. Having ordered the boats to be brought nearer the ſhore, he was among the firſt who fled. His bravoes fought deſperately for ſome time after he had left them; but they were at length thrown down from the intrenchments, and compelled to fly to their boats with the utmoſt precipitation. The Chriſtians purſued them, and the batteries continued firing on them without intermiſſion. Many of the boats were ſunk; the water was covered with dead bodies, mangled limbs, ſhields and helmets. Of the 4000 who had been ſent on this enterpriſe, ſcarcely 500 remained, and many of theſe were dangerouſly wounded.

Haſcem was not more fortunate in his aſſault by land than Candeliſſa was by ſea. After having been repulſed at one breach with great ſlaughter, he rallied his troops, and led them on to another, where he fought long and deſperately, till, moſt of the bravoes having fallen by his ſide, he was obliged, with much reluctance and ſorrow, to ſound a retreat.

17
Incredible valour of the Malteſe.

Muſtapha, not unmindful of his promiſe to ſupport him, no ſooner perceived him beginning to retire, than he ordered the janizaries, whom he kept under arms, to advance. The garriſon had maintained an engagement with Haſcem for five hours, in the middle of the day, and in the hotteſt ſeaſon of the year; yet, as if they had not been ſubject to the wants and weakneſſes of humanity, they advanced beyond the breach to meet the janizaries, and fought apparently with as much vigour and fortitude as before. By the power of ſuperior numbers, they were compelled to fall back within the breach. But there they made the moſt deſperate reſiſtance; and, being reinforced by De Giou and De Quiney, with the troops which had triumphed over Candeliſſa, they at laſt repulſed the janizaries with dreadful ſlaughter; after having loſt more than 40 knights, and 200 of the braveſt of the common men.

Muſtapha, enraged by this invincible obſtinacy which the Chriſtians diſplayed in their defence, and dreading that the Spaniſh ſuccours, which had been already delayed much longer than he expected, might ſoon arrive, reſolved now to employ his whole force at once, and while he himſelf proſecuted the ſiege of Fort St Michael with one half of his troops, to employ the other, under Piali, againſt the town. More batteries were raiſed; the trenches were advanced ſtill nearer than before; bridges of ſail-yards and maſts were thrown over the ditches; mines, notwithſtanding the hard and rocky ſoil, were ſprung; aſſaults were repeated without number; and the two baſhas, emulous of one another, and each of them agitated with continual anxiety leſt victory ſhould declare firſt for his competitor, exhibited the moſt ſhining proofs of perſonal courage, and exhauſted all the art of war then known in the world. Yet, through the determined bravery of the knights, conducted by the grand maſter with conſummate prudence and indefatigable vigilance, the Turks were baffled in every attempt, and repulſed with ſlaughter. Muſtapha flattered himſelf once with the moſt ſanguine hopes of ſucceſs on his part, from a machine invented by his principal engineer, in the form of a huge caſk bound ſtrongly with iron hoops, and filled with gunpowder, nails, chains, bullets, and ſuch other inſtruments of death. After ſetting fire to a train which was faſtened to this machine, it was thrown, by the force of an engine, upon a ravelin that was the principal defence of the fort. But the garriſon, undiſmayed, found means, before it caught fire, to caſt it out again into the midſt of the aſſailants. In a moment afterwards it burſt with dreadful fury, and filled the Turks with conſternation. The knights then ſallied out upon them ſword in hand; and, taking advantage of their confuſion, killed many of them, and put the reſt to flight.

18
A great number of Turks deſtroyed by a contrivance of the town.

Piali had, on ſome occaſions, ſtill more reaſon than Muſtapha to entertain the hopes of victory, although the town was much ſtronger than the fort, and La Valette commanded there in perſon. By his batteries he had demoliſhed all the outworks of the place, and had made an immenſe breach in the wall. While his troops were engaged in a furious aſſault, that engroſſed the whole attention of the beſieged from morning till night, he employed a great number of pioneers in raiſing a cavalier or platform of earth and ſtones, cloſe by the breach; and ſo high as to overlook the parapet. Night, in the mean time, came on, and prevented him from carrying any further this great advantage; but he doubted not that next day he ſhould be able to make himſelf maſter of the place.

19
The grand-maſter prevents the knights from abandoning the town.

As ſoon as he had drawn off his forces, a council of the order was convened, and moſt of the knights were of opinion that the town was no longer tenable; that the fortifications which ſtill remained ſhould be blown up; and that the garriſon and inhabitants ſhould retire into the caſtle of St Angelo. But the grand maſter received this propoſal with horror and indignation. "This would be in effect (ſaid he), to deliver the whole iſland into the hands of the infidels. Fort St Michael, which has been ſo gallantly defended, and which is preſerved by its communication with the town, would thus be ſoon reduced to the neceſſity of ſurrendering. There is no room in the caſtle of St Angelo for the inhabitants and troops; nor, if there were room, is there water in that fort for ſo great a number." It was then propoſed, that at leaſt the relics of the ſaints and the ornaments of the churches ſhould be carried into the caſtle; and the knights earneſtly entreated the grand maſter to retire into it himſelf, aſſuring him that they would conduct the defence with the utmoſt vigour and vigilance. "No, my brethren (he replied), what you propoſe as to the ſacred things would ſerve only to intimidate the ſoldiers. We muſt conceal our apprehenſions. It is here we muſt either die or conquer. And is it poſſible that I, at the age of 71, can end my life ſo honourably as in fighting, together with my friends and brethren, againſt the implacable enemies of our holy faith?" He then told them what he thought proper to be done, and proceeded inſtantly to put it into execution. Having called all the ſoldiers from Fort St Angelo, except a few who were neceſſary for managing the artillery, he employed them and the inhabitants all night in throwing up intrenchments within the breach; after which he ſent out ſome of the braveſt knights, with a ſelect body of troops, to make an attempt on the cavalier. Theſe men ſtole ſoftly along the foot of the wall till they arrived at the place appointed; when they ſet up a loud ſhout, and attacked the guards whom Piali had left there with ſo much fury, that the Turks, believing the whole garriſon had fallen upon them, abandoned their poſt, and fled precipitately to their camp.

The cavalier was immediately fortified, a battery of cannon planted on it, and a parapet raiſed on the ſide towards the enemy. And thus the breach was rendered impracticable; the town put in greater ſecurity than before; and a work, which had been deviſed for its deſtruction, converted into a bulwark for its defence.

The grand maſter had now greater confidence than ever of being able to hold out till the Spaniards ſhould come to his relief. In conſequence of the aſſurances given by Philip and the Sicilian viceroy, he had, long before this time, entertained the hopes of their arrival; and had often earneſtly ſolicited the viceroy to haſten his departure from Meſſina. The conduct of this nobleman was long exceedingly myſterious. The patience of the knights was worn out by his delays; and they, and many others, ſuſpected that the real motive of his conduct was the dread of encountering with an admiral of ſo conſiderable reputation as Piali. But it afterwards appeared that the viceroy had acted agreeably to his inſtructions from the court of Spain. For although Philip was, for the reaſons above mentioned, ſincerely intereſted in the preſervation of the knights, and had amuſed them with the moſt flattering promiſes of aſſiſtance; yet he ſeems from the firſt to have reſolved not to expoſe himſelf to danger on that account, and to avoid, if poſſible, a general engagement.

Philip was affected by their danger only ſo far as it threatened the tranquillity of his own dominions. He had reſolved to interpoſe in their behalf, rather than to ſuffer them to be overpowered; but he appears to have been very little touched with their calamities, and to have intended to leave them to themſelves, as long as there was any proſpect of their being able to make reſiſtance; by doing which he conſidered, that he would not only preſerve his own ſtrength entire, but might afterwards engage with the Turks when they were exhauſted by the operations of the ſiege.

Philip adhered inflexibly to this plan, notwithſtanding the grand maſter's repeated importunities, much longer than was conſiſtent with his own ſelfiſh views. For, without a degree of fortitude and prowefs on the part of the garriſon, and a degree of wiſdom, vigilance, and magnanimity on that of the grand maſter, infinitely higher than there could be reaſon to expect, it muſt have been impoſſible for ſuch a handful of men to have withſtood, for ſo long a time, ſo great a force, and ſuch mighty efforts, as were employed to reduce them. Even the death of the grand maſter alone, whoſe perſon was expoſed to perpetual danger, would have proved fatal to the knights, long before Philip ſent orders to his viceroy to give them any effectual ſupport; and in this caſe, as his own dominions or his fleet would have been immediately attacked, he would probably have had little reaſon to be ſatisfied with the timid ungenerous counſels which he purſued.

Whatever judgement may be formed on this head, the viceroy did not think himſelf at liberty to yield to the repeated applications of the grand maſter, till the operations of the ſiege began to relax, and the Turkiſh forces were reduced from 45,000 to 15,000 or 16,000; of whom many were worn out with the fatigues which they had undergone, and others rendered unfit for action by a bloody flux, which for ſeveral weeks had raged amongſt them.

In this ſituation of affairs, when it was probable that the knights would, without aſſiſtance, have compelled the Turks to raiſe the ſiege, the viceroy let the grand maſter know, that he had now received ſuch inſtructions from the king, as put it in his power to ſhow his attachment to the order: that hé was not indeed permitted to attack the Turkiſh fleet; but that he would immediately bring him a ſtrong body of troops, whoſe commanders (as he himſelf muſt return to Sicily) were to be entirely ſubject to the grand maſter's authority till the enemy ſhould be expelled.

20
The knights receive a reinforcement.

The viceroy, although ſtill ſuſpected of interpoſing unneceſſary delays, at length fulfilled his promiſe; and on the 7th of September landed 6000 men, under Don Alvaro de Sandé and Aſcanio della Corna, in that part of the iſland which lay at the greateſt diſtance from the Turks; after which, he immediately carried back the fleet to Sicily.

21
The Turks raiſe the ſiege in a panic.

In the mean time, intelligence being brought to Muſtapha that the Spaniards were landed, and marching towards him, he was thrown into the moſt dreadful conſternation. Senſible that his ſoldiers were much diſheartened by their ill ſucceſs, he imagined that he was about to be attacked by a ſuperior army, conſiſting of the braveſt and beſt diſciplined troops in Spain. Without waiting for information of their number, he forthwith raiſed the ſiege, drew his garriſon out of St Elmo, and, leaving all his heavy cannon behind him, embarked his troops with as much precipitation as if the Spaniards with ſuperior forces had been in ſight. He had ſcarcely got on board when a deſerter arrived from the Spaniſh camp, and informed him, that with 15,000 or 16,000 men, he had fled before an army that did not exceed 6000, having no general at their head, and commanded by officers who were independent of one another. The baſha was overwhelmed with ſhame and vexation by this intelligence, and would have immediately diſembarked; but this, he knew, he durſt not attempt without conſulting Piali, Haſcem, and his other principal officers.

While he was deliberating upon it, the grand maſter improved to the beſt advantage the leiſure that was afforded him. He employed all the inhabitants, men, women, and children, as well as the ſoldiers, in filling up the enemy's trenches, and demoliſhing their works; and put a garriſon without delay into Fort St Elmo; in which the Turks now beheld from their ſhips the ſtandard of St John erected, where that of Mahomet had lately ſtood.

This demonſtrated to Muſtapha how much new labour awaited him in caſe he ſhould return to the ſiege; but being enraged againſt himſelf on account of the precipitancy of his retreat, and diſquieted at the thoughts of the reception which he had reaſon to expect from Solyman, he wiſhed to atone for his imprudence, and to wipe off the reproach in which it had involved him, by victory or death. Piali, who, from his jealouſy of the baſha's credit with the ſultan, was not ſorry for the failure of his enterpriſe, repreſented in a council of war convened on this occaſion, That as the troops were much diſpirited and worn out, it would be expoſing them to certain deſtruction, either to lead them againſt the enemy, or to reſume the operations of the ſiege. But the majority of the council were of a different opinion; and it was reſolved to land the forces again without delay.

22
They return, but are defeated.

The Turkiſh ſoldiers complained bitterly of this unexpected reſolution, and obeyed the orders to diſembark with the greateſt reluctance. Their officers were obliged to employ threats with ſome, and force with others. At length the number intended was put on ſhore, and Muſtapha ſet out at their head in ſearch of the enemy.

The grand maſter had not neglected to give early notice of their march to the Spaniſh commanders, who had intrenched their little army on a ſteep hill; which the Turks would have found almoſt inacceſſible, and it was the opinion of ſome of the principal officers, that they ſhould avail themſelves of the advantage of their ſituation, and ſtand on their defence. But this propoſal was rejected with diſdain by the bold adventurous De Sandé, and the greateſt part of the Spaniſh officers; and the troops were led out of their encampment, to meet the enemy in the open field. This conduct, more fortunate perhaps than prudent, contributed to increaſe the dejection of the Turkiſh ſoldiers, and to facilitate their defeat. Having been dragged againſt their inclination to the field of battle, and being attacked by the Spaniards with great fury, both in front and flank, they ſcarcely fought, but, being ſtruck with a ſudden panic, fled with the utmoſt precipitation.

Muſtapha, confounded and enraged by this puſillanimous behaviour of his troops, was hurried along by the violent tide of the fugitives. He fell twice from his horſe, and would have been taken priſoner if his officers had not reſcued him. The Spaniards purſued briſkly till they came to the ſea ſhore. There Piali had his boats ready to receive the Turks, and a number of ſhallops filled with muſketeers drawn up to favour their eſcape. Without this precaution, they muſt all have periſhed; and, even notwithſtanding the protection which it afforded them, the number of their killed amounted to 2000 men, while the victors loſt only 13 or 14 at moſt.

Such, after four months continuance, was the conclusion of the fiege of Malta, which will be for ever memorable on account of that extraordinary difplay of the moft generous and heroic valour, by which the knights, fo few in number, were enabled to baffle the moft vigorous efforts which could be made to fubdue them by the moft powerful monarch in the world. The news of their deliverance gave univerfal joy to the Chriftian powers; and the name of the grand mafter excited everywhere the higheft admiration and applaufe. Congratulations were fent him from every quarter; and in many ftates public rejoicings were celebrated on account of his fuccefs.

With this fiege is concluded every thing of importance in the hiftory of Malta. The power of the Turks began about this time to be fo much circumfcribed, that they ceafed to be formidable to the Chriftian nations, and the knights of Malta had no longer an opportunity of exerting their valour as formerly. The beft defcription of Malta we have met with is that given by Mr Brydone.

Defcription of the ifland, &c.

"The approach of the ifland (fays he), is very fine, although the fhore is rather low and rocky. It is everywhere made inacceffible to an enemy by an infinite number of fortifications. The rock, in many places, has been floped into the form of a glacis, with ftrong parapets and intrenchments running behind it.—On getting afhore we found ourfelves in a new world indeed.—The ftreets (of Valetta) crowded with well-dreffed people, who have all the appearance of health and affluence; and we were conducted by the Englifh conful to an inn, which had more the appearance of a palace.

"After dinner we went to vifit the principal villas of the ifland; particularly thofe of the grand mafter and the general of the galleys, which lie contiguous to one another. Thefe are nothing great or magnificent; but they are admirably contrived for a hot climate, where, of all things, fhade is the moft defirable. The orange groves are indeed very fine, and the fruit they bear fuperior to any thing of the kind in Spain or Portugal.

"The afpect of the country is far from being pleafing: the whole ifland is a great rock of very white freeftone; and the foil that covers this rock is, in moft places, not more than five or fix inches deep: yet, what is fingular, we found their crop in general was exceedingly abundant. They account for it from the copious dews that fall during the fpring and fummer months: and pretend likewife that there is a moifture in the rock below the foil, that is of great advantage to the corn and cotton, keeping its roots perpetually moift and cool; without which fingular quality, they fay, they could have no crop at all, the heat of the fun being fo exceedingly violent.—The whole ifland produces corn only fufficient to fupply its inhabitants for five months or little more; but the crop they moft depend upon is the cotton. They begin to fow it about the middle of May, and continue till the middle of June; and the time of reaping is in the month of October and beginning of November.

"They pretend that the cotton produced from this plant, which is fown and reaped in four months, is of a much fuperior quality to that of the cotton-tree. I compared them; but I cannot fay I found it fo: this is indeed the fineft; but that of the cotton-tree is by much the ftrongeft texture. The plant rifes to the height of a foot and a half; and is covered with a number of nuts or pods full of cotton: Thefe, when ripe, they are at great pains to cut off every morning before funrife; for the heat of the fun immediately turns the cotton yellow: which indeed we faw from thofe pods they fave for feed.

"They manufacture their cotton into a great variety of ftuffs. Their ftockings are exceedingly fine. Some of them, they affured us, had been fold for ten fequins a pair. Their coverlets and blankets are efteemed all over Europe. Of thefe the principal manufactures are eftablifhed in the little ifland of Gozzo, where the people are faid to be more induftrious than thofe of Malta, as they are more excluded from the world, and have fewer inducements to idlenefs. Here the fugar cane is ftill cultivated with fuccefs, though not in any confiderable quantity.

"The Maltefe oranges certainly deferve the character they have of being the fineft in the world. The feafon continues for upwards of feven months, from November till the middle of June; during which time thofe beautiful trees are always covered with abundance of delicious fruit. Many of them are of the red kind, much fuperior, in my opinion, to the others, which are rather too lufcious. They are produced, I am told, from the common orange bud, ingrafted on the pomegranate ftock. The juice of this fruit is as red as blood, and of a fine flavour. The greateft part of their crop is fent in prefents to the different courts of Europe, and to the relations of the chevaliers.

"The induftry of the Maltefe in cultivating their little ifland is inconceivable. There is not an inch of ground loft in any part of it; and where there was not foil enough, they have brought over fhips and boats loaded with it from Sicily, where there is plenty, and to fpare. The whole ifland is full of enclofures of freeftone, which give the country a very uncouth and barren afpect; and in fummer reflect fuch a light and heat, that it is exceedingly difagreeable and offenfive to the eyes. The inclofures are very fmall and irregular, according to the inclination of the ground. This, they fay, they are obliged to obferve, notwithftanding the deformity it occafions; otherwife the floods, to which they are fubject, would foon carry off their foil.

"The ifland is covered over with country houfes and villages, befides feven cities, for fo they term them; but there are only two, the Valetta, and Citta Vecchia, that by any means deferve that appellation. Every little village has a noble church, elegantly finifhed, and adorned with ftatues of marble, rich tapeftry, and a large quantity of filver plate.

"The city of Valetta has certainly the happieft fituation that can be imagined. It ftands upon a peninfula between two of the fineft ports in the world, which are defended by almoft impregnable fortifications. That on the fouth fide of the city is the largeft. It runs about two miles into the heart of the ifland; and is fo very deep, and furrounded by fuch high grounds and fortifications, that they affured us the largeft fhips of war might ride here in the moft ftormy weather, almoft without a cable.

"This beautiful bafon is divided into five diftinct harbours, all equally ſafe, and each capable of containing an immenſe number of ſhipping. The mouth of the harbour is ſcarcely a quarter of a mile broad, and is commanded on each ſide by batteries that would tear the ſtrongeſt ſhip to pieces before ſhe could enter. Beſides this, it is fronted by a quadruple battery, one above the other, the largeſt of which is *a fleur d'eau*, or on a level with the water. Theſe are mounted with about 80 of their heavieſt artillery: ſo that this harbour, I think, may really be conſidered as impregnable; and indeed the Turks have ever found it ſo, and I believe ever will.

"The harbour on the north ſide of the city, although they only uſe it for fiſhing, and as a place of quarantine, would, in any other part of the world, be conſidered as ineſtimable. It is likewiſe defended by very ſtrong works; and in the centre of the baſon is an iſland on which they have built a caſtle and a lazaret.

"The fortifications of Malta are indeed a moſt ſtupendous work. All the boaſted catacombs of Rome and Naples are a trifle to the immenſe excavations that have been made in this little iſland. The ditches, of a vaſt ſize, are all cut out of the ſolid rock. Theſe extend for a great many miles, and raiſe our aſtoniſhment to think that ſo ſmall a ſtate has ever been able to make them.

"One ſide of the iſland is ſo completely fortified by nature, that there was nothing left for art. The rock is of a great height, and abſolutely perpendicular from the ſea for ſeveral miles. It is very ſingular, that on this ſide there are ſtill the veſtiges of ſeveral ancient roads, with the tracks of carriages worn deep in the rocks. Theſe roads are now terminated by the precipice, with the ſea beneath; and ſhow, to a demonſtration, that this iſland has formerly been of a much larger ſize than it is at preſent; but the convulſion that occaſioned its diminution is probably much beyond the reach of any hiſtory or tradition. It has been often obſerved, notwithſtanding the very great diſtance of Mount Ætna, that this iſland has generally been more or leſs affected by its eruptions; and they think it probable, that on ſome of theſe occaſions a great part of it may have been ſhaken into the ſea.

"One half of Mount Ætna is clearly diſcovered from Malta. They reckon the diſtance near 200 Italian miles. And the people of Malta affirm, that, in great eruptions of the mountain, their whole iſland is illuminated, and from the reflection in the water there appears a great tract of fire all the way from Malta to Sicily. The thundering of the mountain is likewiſe diſtinctly heard.

"We made an expedition through the iſland in coaches drawn by one mule each; the only kind of vehicle the iſland affords. The catacombs, not far from the ancient city of Melita, are a great work; they are ſaid to extend for 15 miles under ground. Many people, they aſſure us, have been loſt in them by advancing too far; the prodigious number of branches making it next to impoſſible to find the way out again. The great ſource of water that ſupplies the city of Valetta takes its riſe near to this place; and there is an aqueduct, compoſed of ſome thouſand arches, that conveys it from thence to the city. The whole of this immenſe work was finiſhed at the private expence of one of the grand maſters.

"Not far from the old city there is a ſmall church dedicated to St Paul; and juſt by the church a miraculous ſtatue of the ſaint, with a viper on his hand; ſuppoſed to be placed on the very ſpot where the houſe ſtood in which he was received after his ſhipwreck on the iſland, and where he ſhook the viper off his hand into the fire without being hurt by it: at which time the Malteſe aſſure us, the ſaint curſed all the venomous animals of the iſland, and baniſhed them for ever. Whether this be the cauſe of it or not, the fact is certain that there are no venomous animals in Malta. They aſſured us, that vipers had been brought from Sicily, and died almoſt immediately on their arrival.

"Adjoining to the church is the celebrated grotto in which the ſaint was impriſoned. It is looked upon with the utmoſt reverence and veneration; and if the ſtories they tell of it be true, it is well entitled to it all. It is exceedingly damp, and produces (I believe by a kind of petrifaction from the water) a whitiſh kind of ſtone, which, they aſſure us, when reduced to powder, is a ſovereign remedy in many diſeaſes, and ſaves the lives of thouſands every year. There is not a houſe in the iſland that is not provided with it: and they tell us there are many boxes of it ſent annually, not only to Sicily and Italy, but likewiſe to the Levant, and to the Eaſt Indies; and (what is conſidered as a daily ſtanding miracle) notwithſtanding this perpetual conſumption, it has never been exhauſted, nor even ſenſibly diminiſhed; the ſaint always taking care to ſupply them with a freſh quantity the day following. I taſted ſome of it, and believe it is a very harmleſs thing. It taſtes like exceeding bad magneſia, and, I believe, has pretty much the ſame effects. They give about a teaſpoonful of it to children in the ſmallpox and in fevers. It produces a copious ſweat about an hour after; and, they ſay, never fails to be of ſervice. It is likewiſe eſteemed a certain remedy againſt the bite of all venomous animals. There is a very fine ſtatue of St Paul, in the middle of this grotto, to which they aſcribe great powers.

"The grand maſter of the knights of Malta is more abſolute, and poſſeſſes more power, than moſt ſovereign princes. His titles are, *Serene Highneſs and Eminence*; and his houſehold attendance and court are all very princely. As he has the diſpoſal of all lucrative offices, he makes of his councils what he pleaſes; beſides, in all the councils that compoſe the juriſdiction of this little nation, he himſelf preſides, and has two votes. He has the diſpoſal of 21 commanderies, and one priory, every five years; and as there is always a number of expectants, he is very much courted. He is choſen by a committee of 21; which committee is nominated by the ſeven nations, three out of each nation. The election muſt be over within three days after the death of the former grand maſter; and, during theſe three days, there is ſcarce a ſoul that ſleeps at Malta: all is cabal and intrigue; and moſt of the knights are maſked, to prevent their particular attachments and connexions from being known: the moment the election is over, every thing returns to its former channel.

"The land force of Malta is equal to the number of men in the iſland fit to bear arms. They have about 500 regulars belonging to the ſhips of war; and 150 compoſe the guard of the prince. The two iſlands of Malta and Gozzo contain about 150,000 inhabitants. The men are exceeding robuſt and hardy. I have ſeen them row for 10 or 12 hours without intermiſſion, and without even appearing to be fatigued. Their ſea force conſiſts of 4 galleys, 3 galliots, 4 ſhips of 60 guns, and a frigate of 36, beſides a number of the quick-ſailing little veſſels called *ſcampavias* (literally *runaways*). Their ſhips, galleys, and fortifications, are not only well ſupplied with excellent artillery, but they have likewiſe invented a kind of ordnance of their own, unknown to all the world beſides. For we found, to our no ſmall amazement, that the rocks were not only cut into fortifications, but likewiſe into artillery, to defend theſe fortifications, being hollowed out, in many places, into the form of immenſe mortars. The charge is ſaid to be about a barrel of gunpowder, over which they place a large piece of wood, made exactly to fit the mouth of the chamber. On this they heap a great quantity of cannon-balls, ſhells, or other deadly materials; and when an enemy's ſhip approaches the harbour, they fire the whole into the air: and they pretend it produces a very great effect; making a ſhower for 200 or 300 yards round, that would ſink any veſſel.

" Notwithſtanding the ſuppoſed bigotry of the Malteſe, the ſpirit of toleration is ſo ſtrong, that a moſque has been lately built for their ſworn enemies the Turks. Here the poor ſlaves are allowed to enjoy their religion in peace. It happened lately that ſome idle boys diſturbed them during their ſervice; they were immediately ſent to priſon, and ſeverely puniſhed. The police indeed is much better regulated than in the neighbouring countries, and aſſaſſinations and robberies are very uncommon; the laſt of which crimes the grand maſter puniſhes with the utmoſt ſeverity. He is ſaid to be much more relaxed with regard to the firſt.

" Perhaps Malta is the only country in the world where duelling is permitted by law. As their whole eſtabliſhment is originally founded on the wild and romantic principles of chivalry, they have ever found it too inconſiſtent with thoſe principles to aboliſh duelling; but they have laid it under ſuch reſtrictions as greatly to leſſen its danger. Theſe are curious enough. The duelliſts are obliged to decide their quarrel in one particular ſtreet of the city; and if they preſume to fight anywhere elſe, they are liable to the rigour of the law. But, what is not leſs ſingular, but much more in their favour, they are obliged, under the moſt ſevere penalties, to put up their ſwords when ordered to do ſo by a *woman*, a *prieſt*, or a *knight*. Under theſe limitations, in the midſt of a great city, one would imagine it almoſt impoſſible that a duel could ever end in blood; however, this is not the caſe: a croſs is always painted oppoſite to the ſpot where a knight has been killed, in commemoration of his fall. We counted about 20 of theſe croſſes.

" About three months ago (Mr Brydone's letter is dated June 7. 1770), two knights had a diſpute at a billiard table. One of them, after giving a great deal of abuſive language, added a blow; but, to the aſtoniſhment of all Malta (in whoſe annals there is not a ſimilar inſtance), after ſo great a provocation he abſolutely refuſed to fight his antagoniſt. The challenge was repeated, and he had time to reflect on the conſequences; but ſtill he refuſed to enter the liſts. He was condemned to make the *amende honorable* in the great church of St John for 45 days ſucceſſively; then to be confined in a dungeon, without light, for five years; after which, he is to remain a priſoner in the caſtle for life. The unfortunate young man who received this blow is likewiſe in diſgrace, as he has not had an opportunity of wiping it out in the blood of his adverſary.

" The horſe-races of Malta are of a very uncommon kind. They are performed without either ſaddle, bridle, whip, or ſpur; and yet the horſes are ſaid to run full ſpeed, and to afford a great deal of diverſion. They are accuſtomed to the ground for ſome weeks before; and although it is entirely over rock and pavement, there are very ſeldom any accidents. They have races of aſſes and mules performed in the ſame manner four times every year. The rider is only furniſhed with a machine like a ſhoemaker's awl, to prick on his courſer if he is lazy.

" As Malta is an epitome of all Europe, and an aſſemblage of the younger brothers, who are commonly the beſt, of its firſt families, it is probably one of the beſt academies for politeneſs in this part of the globe; beſides, where every one is entitled by law as well as cuſtom to demand ſatisfaction for the leaſt breach of it, people are under a neceſſity of being very exact and circumſpect, both with regard to their words and actions."

Malta was taken by the French army under General Bonaparte, deſtined to invade Egypt, in the year 1799, but ſoon after retaken by the Britiſh, and agreed to be given up to the knights of St John of Jeruſalem, by the treaty of Amiens, in 1802. The Britiſh troops did not evacuate the iſland even after this treaty, as the government inſiſted on retaining it for 10 years, which propoſal was rejected by France, and formed one cauſe of the recommencement of hoſtilities in June 1803.

Knights of MALTA, otherwiſe called *Hoſpitalers of St John of Jeruſalem*, a religious military order, whoſe reſidence is in the iſland of Malta, ſituated in the Mediterranean ſea, upon the coaſt of Africa. The Knights of Malta, ſo famous for defending Chriſtendom, had their riſe as follows:

Some time before the journey of Godfrey of Bouillon into the Holy Land, ſome Neapolitan merchants, who traded in the Levant, obtained leave of the caliph of Egypt to build a houſe for thoſe of their nation who came thither on pilgrimage, upon paying an annual tribute. Afterwards they built two churches, and received the pilgrims with great zeal and charity. This example being followed by others, they founded a church in honour of St John, and an hoſpital for the ſick; whence they took the name of *Hoſpitalers*. A little after Godfrey of Bouillon had taken Jeruſalem, in 1099, they began to be diſtinguiſhed by black habits and a croſs with eight points; and, beſides the ordinary vows, they made another, which was to defend the pilgrims againſt the inſults of the infidels. This foundation was completed in 1104, in the reign of Baldwin; and ſo their order became military, into

which

Malta. which many perſons of quality entered, and changed the name of *hoſpitalers* into that of *knights*.

When Jeruſalem was taken, and the Chriſtians loſt their power in the Eaſt, the knights retired to Acre or Ptolemais, which they defended valiantly in 1290. Then they followed the king of Cyprus, who gave them Limiſſon in his dominions, where they ſtaid till 1310. That ſame year they took Rhodes, under the grand maſter Fulques de Villaret, a Frenchman; and next year defended it againſt an army of Saracens: ſince which the grand maſters have uſed theſe four letters, F. E. R. T. i. e. *Fortitudo ejus Rhodum tenuit*; and the order was from thence called *knights of Rhodes*.

In 1522, Solyman having taken Rhodes, the knights retired into Candia, and thence into Sicily. In 1530, Charles V. gave them the iſland of Malta, to cover his kingdom of Sicily from the Turks. In 1566, Solyman beſieged Malta; but it was gallantly defended by the grand maſter John de Valette Pariſot, and the Turks obliged to quit the iſland with great loſs.

The knights conſiſted of eight different languages or nations, of which the Engliſh were formerly the ſixth; but at preſent they are but ſeven, the Engliſh having withdrawn themſelves. The firſt is that of Provence, whoſe chief is grand commendator of religion; the ſecond, of Auvergne, whoſe chief is mareſchal of the order; the third, of France, whoſe chief is grand hoſpitaler; the fourth of Italy, and their chief, admiral; the fifth of Arragon, and their chief, grand conſervator; the ſixth of Germany, and their chief, grand bailiff of the order; the ſeventh of Caſtile, and their chief, grand chancellor. The chief of the Engliſh was grand commander of the cavalry.

None are admitted into this order but ſuch as are of noble birth both by father and mother's ſide for four generations, excepting the natural ſons of kings and princes. The knights are of two ſorts: thoſe who have a right to be candidates for the dignity of grand maſter, called *grand croſſes*; and thoſe who are only *knights-aſſiſtants*, who are taken from good families. They never marry; yet have continued from 1090 to the preſent time.

The order conſiſts of three eſtates; the knights, chaplains, and ſervants at arms. There are alſo prieſts who officiate in the churches; friar-ſervants, who aſſiſt at the offices; and *donnes* or *demi-croſſes*; but theſe are not reckoned as conſtituent parts of the body. This diviſion was made in 1130, by the grand maſter Raimond du Puy.

The government of the order is mixed, being partly monarchical, and partly ariſtocratical. The grand maſter is ſovereign, coins money, pardons criminals, and gives the places of grand priors, bailiffs, knights, &c. The ordinary council is compoſed of the grand maſter and the grand croſſes. Every language has ſeveral grand priories, and every priory a certain number of commanderies.

The knights are received into this order, either by undergoing the trials preſcribed by the ſtatutes, or by diſpenſations. The diſpenſations are obtained either by the pope's brief, or by a general chapter of the order, and are granted in caſe of ſome defect as to the nobility of their pedigree, eſpecially on the mother's ſide. The knights are received, either as of age, under minority, or pages to the grand maſter. They muſt be 16 years old complete before they are received: they enter into the noviciate at 17, and are profeſſed at 18. They ſometimes admit infants of one year old; but the expence is about 4000 livres. The grand maſter has 16 pages who ſerve him, from 12 to 16 years of age. The knights wear on the left ſide of their cloak or waiſtcoat a croſs of white waxed cloth, with eight points, which is their true badge; that of gold being only for ornament. When they go to war againſt the Turks, they wear a red caſſock, with a great white croſs before and behind, without points, which are the arms of the religion. The ordinary habit of the grand maſter is a ſort of caſſock of tabby-cloth, tied about with a girdle, at which hangs a great purſe, to denote the charitable inſtitution of the order. Over this he wears a velvet gown; and on the left ſide a white croſs with eight points. His yearly revenue is 10,000 ducats. He acknowledges the kings of Spain and both the Sicilies, as his protectors; and is obliged by his agreement with the emperor Charles V. to ſuppreſs pirates.

The knights of Malta were deprived of their privileges and had their eſtates ſequeſtered by order of Maximilian Joſeph, elector of Bavaria; but after Paul emperor of Ruſſia took them under his protection, they were all reſtored. A treaty to this effect was ſigned on the 29th of July 1799, by Baron Flaxman, grand-croſs of the order of St John of Jeruſalem.

Malton ‖ Malvern.

MALTON, a town of the north riding of Yorkſhire in England, ſeated on the river Derwent, over which there is a good ſtone bridge. It is compoſed of two towns, the New and the Old; and is well inhabited, accommodated with good inns, and ſends two members to parliament. W. Long. 0. 40. N. Lat. 54. 8.

MALVA, the MALLOW, a genus of plants belonging to the monodelphia claſs; and in the natural method ranking under the 37th order, *Columniferæ*. See BOTANY *Index*.

MALVERN, GREAT and LITTLE, (with the *Chaſe* and the *Hills*); two towns of Worceſterſhire, in which were formerly two abbeys, about three miles aſunder. Since the diſſolution nothing remains of the abbey of *Great Malvern* but the gateway of the abbey and church, now parochial. Part of it was a religious cell for hermits before the Conqueſt; and the greateſt part, with the tower, built in the reign of William the Conqueror. Its outward appearance is very ſtriking. It is 171 feet in length, 63 in breadth, and 63 in height. In it are ten ſtalls; and it is ſuppoſed to have been rebuilt in the year 1171. The nave only remains in part, the ſide aiſles being in ruins. The windows have been beautifully enriched with painted glaſs, and in it are remains of ſome very ancient monuments. *Little Malvern* ſtands in a cavity of the hills, which are great lofty mountains, riſing like ſtairs, one higher than another, for about ſeven miles, and divide this county from Herefordſhire. There is a ditch here very much admired. On the hills are two medicinal ſprings, called *holy wells*, one good for the eyes, and the other for cancers. Henry VII. his queen, and his two ſons, Prince Arthur and Prince Henry, were ſo delighted with this place, that they beautified the church and windows, part of which remain, though mutilated. In the lofty ſouth windows of the church are the hiſtorical paſſages of the Old Teſtament; and in the north windows the pictures of the holy family, the nativity and circumciſion of our Saviour, the adoration of the ſhepherds and the kings, his preſentation in the temple, his baptiſm, faſting, and temptation, his miracles, his laſt ſupper with his diſciples, his prayer in the garden, his paſſion, death, and burial, his deſcent into hell, his reſurrection and aſcenſion, and the coming of the Holy Ghoſt. The hiſtory of our Saviour's paſſion is painted differently in the eaſt window of the choir, at the expence of Henry VII. whoſe figure is therefore often repreſented, as is that of his queen. In the weſt window is a noble piece of the day of judgement, not inferior to the paintings of Michael Angelo. *Malvern Chace* contains 7115 acres in Worceſterſhire (beſides 241 acres called the Prior's Land), 619 in Herefordſhire, and 103 in Glouceſterſhire. *Malvern Hills* run from north to ſouth, the higheſt point 1313 feet above the ſurface of the Severn at Hanley, and appear to be of limeſtone and quartz. On the ſummit of theſe hills is a camp with a triple ditch, imagined to be Roman, and is ſituated on the Herefordſhire ſide of the hills.

MALUS. See PYRUS, BOTANY *Index*.

MAMALUKES, the name of a dynaſty that reigned in Egypt. See EGYPT.

MAMBRUN, PETER, an ingenious and learned French Jeſuit, born in the dioceſe of Clermont, in the year 1581. He was one of the moſt perfect imitators of Virgil in Latin poetry, and his poems are of the ſame ſpecies: Thus he wrote *Eclogues*, *Georgics*, or four books on the culture of the ſoul and the underſtanding; together with a heroic poem, entitled *Conſtantine*, or *Idolatry overthrown*. He ſhowed alſo great critical abilities in a Latin *Peripatetical Diſſertation on Epic Poetry*. He died in 1661.

MAMERTINI, a mercenary band of ſoldiers which paſſed from Campania into Sicily at the requeſt of Agathocles. When they were in the ſervice of Agathocles, they claimed the privilege of voting at the election of magiſtrates at Syracuſe, and had recourſe to arms to ſupport their unlawful demands. The ſedition was appeaſed by the authority of ſome leading men, and the Campanians were ordered to leave Sicily. In their way to the coaſt they were received with great kindneſs by the people of Meſſana, and ſoon returned perfidy for hoſpitality. They conſpired againſt the inhabitants, murdered all the males in the city, married their wives and daughters, and rendered themſelves maſters of the place. After this violence they aſſumed the name of Mamertini, and called their city Mamertum, or Mamertium, from a provincial word which in their language ſignified *martial* or *warlike*. The Mamertines were afterwards defeated by Hiero, and totally diſabled to repair their ruined affairs.

MAMMÆ, in *Anatomy*. See there, N° 227.

M A M M A L I A,

1 Definition.

THE firſt claſs of the animal kingdom in the ſyſtem of Linnæus, containing thoſe animals which have *breaſts* or *paps*, (*mammæ*) at which they ſuckle their young. In this claſs are included, not only what are called the *viviparous quadrupeds*, but the BAT tribe, and ſeveral marine animals, as SEALS and WHALES. In the preſent article, we are to give an account of all but the whales, or CETACEA, which have been already fully treated of under the article CETOLOGY.

INTRODUCTION.

2 Utility of this part of natural hiſtory.

The relations that ſubſiſt between man and many of the animals arranged in this claſs, either from their utility as domeſtic ſervants, or from the warfare that they carry on againſt him, his property or his dependants, render the ſtudy of this part of natural hiſtory peculiarly important; while the extraordinary actions and faculties of ſome of theſe animals muſt make the hiſtory of them highly intereſting to every one who examines nature with a curious or diſcerning eye.

3 Our knowledge of it imperfect.

Quadrupeds have, accordingly, engaged the particular attention of naturaliſts in every country and in every age, and as our acquaintance with them is leſs difficult than with moſt other claſſes of animated nature, it is not ſurpriſing that their form, habits, and manners are moſt familiar to us. Still, indeed, much remains [illegible] reſpecting ſome of the foreign and rarer quadrupeds, and of ſome we know little more than the name. Even with regard to thoſe which have been longeſt known and deſcribed, as the *lion*, the *elephant*, the *porcupine*, &c. the obſervations of modern naturaliſts and travellers have corrected ſeveral erroneous notions that had been generally received as certain. Long as this part of natural hiſtory has occupied the attention of mankind, there yet probably remain many gleanings to repay the induſtry of future inquirers. It is probable that the unexplored regions of Africa, America, and New Holland, may contain many quadrupeds either entirely unknown to us at preſent, or known only by the foſſil remains that have been diſcovered in the bowels of the earth. There can, we think, be little doubt that the unicorn exiſts in Africa not far north of the Cape of Good Hope, and perhaps, at ſome diſtant period it may be as well known as the elephant or the hippopotamus is at preſent *.

To attempt any thing like a critical examination of even the moſt celebrated writers on the natural hiſtory of the mammalia would far exceed the limits which we are obliged to preſcribe to this article. We ſhall however, briefly notice ſome of the more important and more intereſting works, to which our readers may refer for information which the nature of this work precludes us from affording them.

4 Writers on mammalia.

Among the ancients, the moſt celebrated writers on natural hiſtory in general, and on quadrupeds in particular, are Ariſtotle and Pliny, and of theſe the former has been much more circumſtantial, and probably much leſs credulous than the latter. Ariſtotle wrote more from obſervation, and the opportunities of obtaining a knowledge

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* See *Barrow's Travels in Southern Africa.*

5 Ariſtotle and Pliny. knowledge of animals that were afforded him by the liberality of his pupil give him a greater claim to our attention and aſſent, than is perhaps due to Pliny, who drew his accounts almoſt entirely from preceding writers. Pliny, however, is a more graceful, more animated, and conſequently a more pleaſing writer, and everywhere diſplays great marks of taſte and erudition.

6 Geſner, Aldrovandus, and Johnſton.

Between the ſubverſion of literature and the beginning of the 17th century, there is ſcarcely a writer on quadrupeds that deſerves particular mention. Even during the 17th century, the labourers in this department were few; and the names of Geſner, Aldrovandus, and Johnſton, alone have been deemed worthy of commemoration in Linnæus's introduction to the mammalia, and of theſe it is by no means certain that the writings on quadrupeds attributed to Aldrovandus are genuine.

7 Pennant.

The 18th century produced a great many valuable works, both ſyſtematic and deſcriptive, on this part of natural hiſtory. As ſyſtematic writers, Ray and Pennant, and on the continent, Klein, Stort, Briſſon, Linnè, Daubenton, and Cuvier, are the moſt celebrated, and we ſhall preſently notice ſome of theſe more at large. As a deſcriptive writer, Pennant is alſo conſpicuous; and the hiſtories of quadrupeds contained in his "Britiſh Zoology" and "Arctic Zoology", are at once accurate and intereſting, amuſing and inſtructive.

8 Buffon.

But of all thoſe naturaliſts who have profeſſed to give a detailed account of the hiſtory of quadrupeds, none have acquired ſuch celebrity as the Count de Buffon, whoſe work is in every one's hands, and has been tranſlated into moſt of the modern languages. For animated and lively deſcriptions, and acute and brilliant remarks, Buffon is perhaps unrivalled: method he ſeems to have deſpiſed; and it is to be regretted that his judgement is not always equal to his taſte, and that his accuracy is ſometimes leſs conſpicuous than his genius and fancy. There are alſo a certain freedom of expreſſion, and luxurioufneſs of deſcription, in treating of certain ſubjects, which render Buffon's work leſs proper for young people than for thoſe who are more advanced both in years and in the ſtudy of nature. Dr Goldſmith's "Hiſtory of the Earth and Animated Nature" is chiefly an abridgement of Buffon.

9 Bewick.

Mr Bewick's "General Hiſtory of Quadrupeds", with wooden cuts, deſerves much praiſe. In his deſcriptions, he has ſelected with much ſkill and taſte, and has added many original and judicious obſervations, eſpecially reſpecting the domeſtic and indigenous animals of this country. His figures are in general excellent, and his vignettes both uſeful and entertaining.

10 Shaw.

Among the lateſt ſyſtematic works written on this ſubject is the elegant and ſplendid "General Zoology" of Dr Shaw. As a muſeum for acquiring a knowledge of the form and external ſtructure of animals, this work has been ſurpaſſed by none, and equalled by very few. Deſcription of the habits or manners of the animals ſeems to have been a ſecondary object with Dr Shaw, as of this his work contains very little. It is chiefly valuable as a *ſyſtematic arrangement* and general *muſeum*.

11 Bingley.

We have ſeen few works more entertaining than Mr Bingley's "*Animal Biography*". It is profeſſedly a compilation, but the extracts are well choſen, and in general highly intereſting. We cannot ſay, however, that they are always happily arranged. As Mr Bingley uniformly quotes his authorities, and has given a liſt of many valuable works from which he has drawn his information, his work is very uſeful, and forms an admirable companion to Dr Shaw's Zoology.

In the following account of the mammalia, we ſhall endeavour to combine amuſement with utility; but, as our limits are exceedingly confined, we can give a detailed account of very few ſpecies. We ſhall therefore ſelect the moſt intereſting individuals, referring here generally to Buffon, Pennant, Bewick, Shaw, and Bingley for the reſt.

With reſpect to the general diviſions of quadrupeds and the terms employed in deſcribing them, we need ſay nothing here; the former will be ſeen from the ſeveral claſſifications to be immediately mentioned, and the latter are explained under their proper heads in the general alphabet of this dictionary. Reſpecting the general anatomical ſtructure of the mammalia, we could add little to what has been already given under *Comparative* ANATOMY. When there occurs any ſtriking peculiarity of conformation in particular individuals, it will be noticed in its proper place.

PART I. CLASSIFICATION OF THE MAMMALIA.

12 Claſſification of Linnæus.

QUADRUPEDS have been very differently claſſified by different naturaliſts. Our limits will permit us only to give a brief ſketch of ſome of the more important arrangements, and we ſhall ſelect thoſe of Linnæus, Pennant and Cuvier.

Linnæus divides the mammalia into ſeven orders, the diſtinctive characters of which are chiefly derived from the number, ſituation, and ſtructure of the teeth.

ORDER I. PRIMATES.

This order is intended to contain man and thoſe animals which are moſt nearly allied to him in their ſtructure. They have uſually four cutting teeth in the fore part of each jaw, and in the upper jaw these are parallel; and they have one canine tooth on each ſide of theſe in each jaw. They have alſo two breaſts or teats, from which this claſs derives its name. The two fore feet in many of the individuals reſemble the hands of the human ſpecies, and are employed for the ſame purpoſes, having fingers furniſhed for the moſt part with oval flattened nails. They chiefly live on vegetable food. Under this order Linnæus ranks four genera, viz. man, the ape tribe, the lemur tribe, and the bats.

Classifica-
tion.

ORDER II. BRUTA.

These have no front teeth in either jaw; their feet are armed with strong thick nails like hoofs; they are generally of an clumsy form, and slow in their movements; they feed chiefly on vegetables. This order contains nine genera, of which the principal are the rhinoceros, the elephant, the ſloths, and ant-eaters.

ORDER III. FERÆ.

Theſe have commonly ſix front teeth in the upper and under jaw, which are ſomewhat of a conical ſhape, and next to theſe ſtrong and ſharp canine teeth, with grinders that terminate in conical pointed eminences; their feet are divided into toes which are armed with ſharp crooked claws. Almoſt all the animals of this order are beaſts of prey, living chiefly on the fleſh of other animals. The order comprehends ten genera, the moſt remarkable of which are, the ſeal, dog, cat, weazel, and bear tribes.

ORDER IV. GLIRES.

Theſe have two front teeth in each jaw, and theſe are remarkably long and large, but they have no canine teeth; their feet are furniſhed with claws, and appear formed both for running and leaping. Their food conſiſts of vegetables. This order alſo contains 10 genera, the principal of which are the porcupines, beavers, rats, ſquirrels, and hares.

ORDER V. PECORA.

Theſe have ſeveral front teeth that are blunt, and have a wedge-like form, in the lower jaw, but no front teeth in the upper; their feet are armed with cloven hoofs; they have four ſtomachs, feed entirely on vegetables, and ruminate or chew the cud. There are in this order eight genera, comprehending the camel, the muſk animal, the giraffe, and the deer, antelope, goat, ſheep, and ox tribes.

ORDER VI. BELLUÆ.

Theſe have front teeth in both jaws that are obtuſe; their feet are armed with hoofs that are in ſome ſpecies entire, and in others ſubdivided. Moſt of them live entirely on vegetable food. There are four genera, compriſing thoſe of the horſe, hippopotamus, tapir, and hog.

ORDER VII. The laſt order is that of the CETÆ, or *Whales;* for which, ſee CETOLOGY.

Objections to Linnæus's arrangement.

Several objections have been made to the above arrangement of Linnæus, and ſome of them appear to be ſufficiently valid. It has been objected with great reaſon, that man, the lord of the creation, is degraded by being placed under the ſame diviſion with apes, monkeys, macaucos and bats, the companions which Linnæus has thought proper to allot to him. However nearly the apes may reſemble man in their general appearance, and the macaucos in the uſe of their fore extremities, they ſhould ſurely have been conſidered apart from man; and nothing, it is ſaid, can be more abſurd than to arrange the inſignificant bat with any of the former animals, becauſe it agrees with them in the number and ſituation of its teeth. To the ſecond order it is objected that the moſt intelligent of quadrupeds, the half-reaſoning elephant, is made to aſſociate with the moſt diſcordant and ſtupid of the creation, with ſloths, ant-eaters, and armadillos, or with creatures of a quite different element, walruſſes and morſes. In the third order again, which from its name ſhould comprehend only the wild beaſts, or beaſts of prey, it will be impoſſible (ſays Mr Pennant) to allow the mole, the ſhrew, and the harmleſs hedgehog, to be the companions of lions, wolves, and bears. We may err in our arrangement

> *Sed non ut placidis coeant immitia, non ut*
> *Serpentes avibus geminentur, tigribus agni* *.

To the ſixth order it has been objected that the hoofed animals arranged under it are ſo diſſimilar in their nature, that they ought not to be placed together without ſome intermediate gradations.

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To many of the above objections it may be replied, that all artificial arrangements have their diſadvantages, and that if we follow nature in placing together only thoſe animals which reſemble each other in their external appearance, or in their habits of life, we ſhall often be obliged to arrange the individuals of what moſt naturaliſts conſider as the ſame genus under very different parts of our ſyſtem. The great object of a ſyſtematic arrangement is to facilitate the diſcovery of objects that are unknown; and for this purpoſe, in reſpect to quadrupeds, there is perhaps no method preferable to that which is founded on the diverſity of their teeth and feet. We ſhall in the following article, as we have done in moſt of the preceding departments of natural hiſtory, adopt the arrangement of Linnæus, modifying according to the lateſt improvements of Gmelin and Shaw.

15
Our celebrated Britiſh naturaliſt, Mr Pennant, publiſhed the firſt edition of his Synopſis of Quadrupeds in 8vo. in 1771; and ten years after he publiſhed a third edition under the new title of Hiſtory of Quadrupeds, in 2 vols. 4to. This work has gone through ſome other editions, and is juſtly admired for the quantity of information which the author has contrived to give in a very condenſed form.

Mr Pennant diſtributes quadrupeds into four general diviſions, containing ſuch as are hoofed, digitated, pinnated, and winged.

The firſt diviſion is ſubdivided into two ſections: the firſt containing thoſe animals whoſe hoofs are entire or of one piece, of which there is only one genus, viz. HORSE. The ſecond ſection thoſe which are cloven-hoofed; of which there are 13 genera, compriſing the OX, SHEEP, GOAT, GIRAFFE, ANTELOPE, MUSK, CAMEL, HOG, RHINOCEROS, HIPPOPOTAME, TAPIR, and ELEPHANT.

The ſecond diviſion conſiſts of digitated animals, or thoſe whoſe feet are divided into toes. It is ſubdivided into five ſections; the firſt of which conſiſts of thoſe animals that are anthropomorphous, or which, in ſome meaſure, reſemble man in their external form. Of theſe there are two genera, viz. APE and MACAUCO. The ſecond ſection conſiſts of rapacious carnivorous animals,

* Pennant's Syn. Quad. Pref.

mals, having six or more cutting teeth in each jaw, and large canine teeth ſeparated from the cutting teeth. Of theſe there are eight genera, comprehending thoſe of the Dog, Hyæna, Cat, Bear, Badger, Opoſſum, Weaſel, and Otter. The third ſection contains animals that have no canine teeth, and only two cutting teeth in each jaw, being generally herbivorous or frugivorous. Of theſe there are 11 genera, viz. Cavy, Hare, Beaver, Porcupine, Marmot, Squirrel, Jerboa, Rat, Shrew, Mole, and Hedgehog. The fourth ſection comprehends thoſe animals which are without cutting teeth, and which, like thoſe of the laſt ſection, live on herbs and fruits. This ſection contains only two genera, viz. thoſe of the Sloth and Armadillo. The fifth ſection contains animals that are deſtitute of teeth, and live on inſects. Of theſe there are two genera, viz. Manis and Ant-Eater.

The third diviſion conſiſts of thoſe animals that are pinnated or furniſhed with fins, and chiefly live in the water, feeding partly on fiſh and partly on herbage. Of theſe there are three genera, viz. the Walrus, Seal, and Manati.

The fourth diviſion, or that of the winged quadrupeds, contains the ſingle genus of the Bat, which being placed laſt in the order of quadrupeds, is thus made to form the connecting link between them and the claſs of birds.

Cuvier. According to Cuvier's arrangement, the mammalia are divided into three general orders: 1. Thoſe having claws or nails; 2. Thoſe having hoofs; and, 3. Thoſe having feet like fins: a diviſion very ſimilar to that of Mr Pennant. The firſt of theſe orders is ſubdivided into thoſe mammalia that have three ſorts of teeth, and thoſe that want at leaſt one kind of teeth.

The firſt ſubdiviſion of the firſt order contains three families, viz.

I. Bimana, having the hands ſeparate on the atlantal* extremities, comprehending Man alone.

II. Quadrumana, having the thumbs or great toes ſeparate on each of the fore feet. This family contains two genera, viz. Simia or Apes, comprehending the ſub-genera pithecus or *oran-otans*, callitrix or *ſapajous*, cercopithecus or *guenons*, cynocephalus or *macaques*, papio or *baboons*, cebus or *alouates*; and Lemur or *Makis*, comprehending the ſub-genera of lemur, indri, lori, galago, and tarſipus.

III. Sarcophaga; having no ſeparate thumbs or great toes on the atlantal extremity. This family is ſubdivided into four ſections, viz. Cheiroptera, or thoſe that have elongated hands and membranes, extending between the feet from the neck to the anus; Plantigrada, or thoſe that have no ſeparate thumbs or great toes, and who, in walking, apply the whole ſole of the foot to the ground; Carnivora, or ſuch as have no ſeparate thumbs or great toes, and which, in walking, tread only on the toes; and Pedimana, or ſuch as have ſeparate great toes on the ſacral extremities or hind feet. The Cheiroptera compriſe two genera, viz. Vesper ilio or *Bats*, comprehending the ſubgenera of pteropus or *rouſſets*, veſpertilio or *common bats*, rhinolphus, phylloſtoma, and noctilio; and Galeopithecus, or *Flying Lemurs*. The Plantigrada contain three genera, viz. Erinaceus or *Hedgehogs*, comprehending the ſubgenera of erinaceus or *hedgehogs*, and tenrec or *tenrecs*; Sorex or *Shrews*, comprehending the ſubgenera of ſorex or *ſhrew mice*, mygali or *musk ſhrews*; Chrysochloris, [illegible] talpa or *moles*; and Ursus or *Bears*, comprehending the ſubgenera of urſus or *bears*, taxus or *badgers*, naſua or *coati*, procyon or *racoons*; [illegible] ichneumon or *mangouſtes*. The Carnivora compriſe four genera, viz. Mustela, or *Weazels*, comprehending the ſubgenera of muſtela, or *weazels* and *martins*, lutra or *otters*, mephites or *mouffetes*, viverra or *civets*; Felis, or *Cat tribe*; and Canis, or the *Dog tribe*, comprehending the ſubgenera of canis and hyæna. The Pedimana contains only one genus, viz. Didelphis or *Opoſſums*, comprehending the ſubgenera of didelphis or *ſarigues*, daſyurus, phalangiſta or *phalangers*.

IV. Rodentia, or ſuch quadrupeds as want only the canine teeth. This family compriſes eight genera, viz. Kangurus, *Kanguroos*; Hystrix or *Porcupines*; Lepus, or *Hares* and *Rabbits*, comprehending the ſubgenera of lepus and lagomys; Cavia, comprehending the ſubgenera of cavia and hydrochærus; Castor or *Beaver*; Sciurus or *Squirrels*, comprehending the ſubgenera of ſciurus and pteromys or *flying ſquirrels*; Cheiromys, or *aye-aye*; and Mus, or *Rat* and *Mouse*, comprehending the ſubgenera of arctomys or *marmots*, lemmus or *field mice*, fiber or *ondatra*, mus or *rats*, cricetus or *hamſters*, ſphalax or *mole rat*, dipus or *jerboas*, myoxus or *dormice*.

V. Edentata, or thoſe mammalia which have neither cutting nor canine teeth. This family compriſes three genera, viz. Myrmecophaga, or *Ant-Eaters*, comprehending the ſubgenera of myrmecophaga, echidna or [illegible]; Orycteropus, or *Cape Ant Eaters*; and Dasypus, or *Armadillos*.

VI. Tardigrada, or ſuch as are deficient only in cutting teeth. Of this family there is only one genus, viz. Bradypus, or *Sloths*; under which Cuvier arranges as a ſubgenus, the unknown animal which he calls *megatherium*.

The ſecond order, or thoſe quadrupeds that are furniſhed with hoofs, compriſes three families, with the following diſtinctions and ſubdiviſions.

VII. Pachydermata, or thoſe animals that have more than two toes and more than two hoofs. In this family there are ſix genera, viz. Elephas or *Elephants*; Tapir or *Tapir*; Sus or *Swine*; Hippopotamus or *River horſe*; Hyrax or *Daman*; and Rhinoceros.

VIII. Ruminantia, having two toes and two hoofs. Of this there are eight genera, viz. Camelus or *Camels*, divided into the ſubgenera of camelus and lama; Moschus or *Musk*; Cervus or *Deer*; Camelopardalis or *Giraffe*; Antilope or *Antelopes*; Capra or *Goats*; Ovis or *Sheep*; and Bos or *Oxen*.

IX. Solipeda, having one toe and one hoof, and compriſing only one genus, viz. Equus or *Horſe*.

The third order, or the mammalia with fin-like feet, contains two families, viz. Amphibia and Cetacea.

X. Amphibia, having four feet, and compriſing two genera, viz. Phoca or *Seals*; and Trichecus or *Morſes*.

XI. Cetacea, containing five genera, viz. Manatus or *Lamantins*; Delphinus or *Dolphins*; Physeter or *Cachalots*; Balæna or *common Whales*; and Monodon or *Narwal**.

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* See Barclay on Anatomical Nomenclature.

GENERIC CHARACTERS.

17 Generic Characters.

18 Primates.

Ordo I. PRIMATES.

Homo. Situs erectus. Hymen et menſtrua feminarum.	Man. Poſture erect. Female furniſhed with a hymen, and menſtruating.

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1. Simia. Dentes laniarii, hinc remoti.	S. Tuſks diſtant from each other.
2. Lemur. Dentes primores ſuperiores 4; inferiores 6.	L. Fore teeth upper 4; lower 6 in number.
3. Galeopithecus. Dentes primores ſuperiores nulli; inferiores 6.	G. Front teeth in the upper jaw wanting; in the lower 6.
* 4. Vespertilio. Manus palmato-volatilis (A).	V. Fore feet palmate, formed for flying.

19 Bruta.

Ordo II. BRUTA.

5. Bradypus. Dentes molares primo longiore, abſque laniariis primoribuſve. Corpus piloſum.	B. Grinders longer in front, without tuſks. Body hairy.
6. Myrmecophaga. Dentes nulli. Corpus piloſum.	M. No teeth. Body hairy.
7. Manis. Dentes nulli. Corpus ſquamatum.	N. No teeth. Body ſcaly.
8. Dasypus. Molares abſque laniariis primoribuſve. Corpus cataphractum.	D. Grinders, without tuſks or cutting teeth. Body cruſtaceous.
9. Rhinoceros. Cornu in fronte poſitum.	R. Horn ſeated in front.
10. Elephas. Dentes laniarii et molares. Naſus proboſcide elongatus.	E. Tuſks and grinders. Noſe elongated into a proboſcis.
11. Sukotyro. Cornu ad utrumque latus prope oculos.	S. A horn on each ſide near the eyes.
12. Platypus. Os anatinum. Pedes palmati.	P. Mouth like a duck's bill. Feet webbed.
13. Trichecus. Dentes laniarii ſuperiores, molares ex oſſe rugoſo. Pedes compedes.	T. Upper tuſks. Grinders rough and bony. Hinder feet uniting into a fin.

20 Feræ.

Ordo III. FERÆ.

* 14. Phoca. Dentes primores ſuperiores 6; inferiores 4.	* P. Six upper cutting teeth; 4 lower.
* 15. Canis. Dentes primores 6, 6; ſuperiores intermedii lobati.	* C. Front teeth, ſix in each jaw; the intermediate upper ones lobated.
* 16. Felis. Dentes primores 6, 6; inferiores æquales. Lingua aculeata.	* F. Cutting teeth ſix in each jaw; the lower equal. Tongue aculeate.
* 17. Viverra. Dentes primores 6, 6; inferiores intermedii breviores.	* V. Cutting teeth 6 in each jaw; the intermediate lower ones ſhorter.
* 18. Lutra. Dentes ut in Viverra. Pedes palmati.	* L. Teeth as in the laſt genus. Feet webbed.
* 19. Ursus. Dentes primores 6, 6; ſuperiores excavati. Penis oſſe flexuoſo.	* U. Cutting teeth 6 in each jaw; the upper hollowed. Penis furniſhed with a flexible bone.
20. Didelphis. Dentes primores ſuperiores 10; inferiores 8.	D. Cutting teeth 10 in the upper jaw; 8 in the lower.
21. Dasyurus. Dentes primores ſuperiores 8; inferiores 6.	D. Cutting teeth 8 in the upper jaw; 6 in the lower.
22. Macropus. Dentes primores ſuperiores 6; inferiores 2. Molares utrinque 5, remoti.	M. Cutting teeth 6 in the upper jaw; 2 in the lower. Grinders 5 on each ſide, remote.
* 23. Talpa. Dentes primores ſuperiores 6; inferiores 8.	* T. Cutting teeth in the upper jaw 6; in the lower 8.

* 24.

(A) The genera marked * have one or more of the ſpecies indigenous to Britain.

Claſſification.

* 24. SOREX. Dentes primores ſuperiores 2; inferiores 4.	* S. Cutting teeth in the upper jaw two: in the lower 4.
* 25. ERINACEUS. Dentes primores ſuperiores 2; inferiores 2.	* E. Cutting teeth two in each jaw.

21 Glires.

ORDO IV. GLIRES.

26. HYSTRIX. Corpus ſpinis tectum.	H. Body covered with ſpines.
27. CAVIA. Dentes primores cuneati. Molares 4 ad utrumque latus. Claviculæ nullæ.	C. Cutting teeth wedge-ſhaped. Grinders 4 on each ſide. Clavicles wanting.
28. CASTOR. Dentes primores ſuperiores cuneati. Molares ad utrumque latus. Claviculæ perfectæ.	C. Upper cutting teeth wedge-ſhaped. Grinders 4 on each ſide. Clavicles complete.
* 29. MUS. Dentes primores ſuperiores cuneati. Molares 3 ad utrumque latus. Claviculæ perfectæ.	* M. Upper cutting teeth wedged ſhape. Grinders 3 on each ſide. Clavicles complete.
30. HYDROMYS. Pedes poſteriores palmatæ. Cauda cylindrica.	H. Hind feet webbed. Tail round.
31. ARCTOMYS. Dentes primores cuneati. Molares ſuperiores 5, inferiores 4, ad utrumque latus. Claviculæ perfectæ.	A. Cutting teeth wedged ſhape. Grinders 5 in the upper jaw, 4 in the lower, on each ſide. Clavicles complete.
* 32. SCIURUS. Dentes primores ſuperiores cuneati; inferiores acuti. Molares ſuperiores 5, inferiores 4, ad utrumque latus. Claviculæ perfectæ. Cauda diſticha. Myſtaces longæ.	* S. Upper cutting teeth wedge ſhaped; lower acute. Grinders 5 in the upper jaw, 4 in the lower, on each ſide. Clavicles complete. Tail ſpreading towards each ſide. Whiſkers long.
* 33. MYOXUS. Myſtaces longæ. Cauda rotunda, apice craſſior.	* M. Whiſkers long. Tail round, thicker at the tip.
34. DIPUS. Pedes anteriores perbreves; poſteriores prælongi.	D. Four fore feet ſhort; hind feet very long.
* 35. LEPUS. Dentes primores ſuperiores duplicati.	* L. Upper cutting teeth double.
36. HYRAX. Dentes primores ſuperiores lati. Cauda nulla.	H. Upper cutting teeth broad. Tail wanting.

22 Pecora.

ORDO V. PECORA.

37. CAMELUS. Ecornis. Dentes laniarii plures.	C. Without horns. Tuſks many.
38. MOSCHUS. Ecornis. Dentes laniarii ſolitarii; ſuperioribus exſertis.	M. Without horns. Tuſks ſingle; upper projecting.
* 39. CERVUS. Cornua ſolida, ramoſa, decidua. Dentes laniarii nulli.	* C. Horns ſolid, branching, deciduous. Tuſks wanting.
40. CAMELOPARDALIS. Cornua breviſſima. Pedes anteriores poſterioribus multo longiores.	C. Horns very ſhort. Fore feet much longer than the hind.
41. ANTILOPE. Cornua ſolida, ſimplicia, perſiſtentia. Dentes laniarii nulli.	A. Horns ſolid, unbranched, perſiſtent. Tuſks wanting.
* 42. CAPRA. Cornua tubuloſa, erecta. Dentes laniarii nulli.	* C. Horns hollow, erect. Tuſks wanting.
* 43. OVIS. Cornua tubuloſa reclinata. Dentes laniarii nulli.	* O. Horns hollow, reclined. Tuſks wanting.
* 44 BOS. Cornua tubuloſa porrecta. Dentes laniarii nulli.	* B. Horns hollow, turned outwards. Tuſks wanting.

23 Belluæ.

ORDO VI. BELLUÆ.

* 45. EQUUS. Dentes primores ſuperiores 6; inferiores 6.	* E. Cutting teeth 6 in each jaw.
46. HIPPOPOTAMUS. Dentes primores ſuperiores 4; inferiores 4.	H. Cutting teeth 4 in each jaw.
47. TAPIR. Dentes primores ſuperiores 10; inferiores 10.	T. Cutting teeth 10 in each jaw.
* 48. SUS. Dentes primores ſuperiores 4; inferiores 6.	* S. Cutting teeth in the upper jaw 4; in the lower 6.

ORDO VII. CETE.—See CETOLOGY

PART II. ARRANGEMENT AND HISTORY OF THE SPECIES.

CHAP. I. PRIMATES.

OF this order we shall here give an account only of the four genera, SIMIA, LEMUR, GALEOPITHECUS, and VESPERTILIO, reserving MAN for a separate article.

GENUS I. SIMIA. *Apes.*

Front teeth four in each jaw, near together: canine solitary, longer than the rest, and at a distance from the grinders. Grinders obtuse.

The animals of this genus, which are best known by the familiar names of apes or monkeys, form a very interesting part of the animal creation; not so much for their importance or utility in relation to man, as on account of the near reſemblance that they bear to the human ſpecies. They are a very lively tribe of animals, full of frolic, chatter, and grimace. From the ſtructure of their hands, they are capable of performing many actions in common with man; and we ſhall preſently relate ſome diverting inſtances of their imitative powers. Moſt of them are fierce and untameable, though ſome are of a more gentle nature, and even been capable of an attachment to man. In general, however, they are prone to miſchief, and are filthy, obſcene, laſcivious, and thieviſh. When offended, they use threatening geſtures; and when pleaſed, they appear to laugh. Many of them have cheek pouches, in which they keep for a while ſuch food as they have not immediate uſe for. They are commonly gregarious, going together in vaſt companies, the different ſpecies never mixing with each other, but keeping apart, and in different quarters. They inhabit woods, and live on trees, leaping with vaſt activity from one tree to another, even though loaded with their young, which cling to them. They are not carnivorous, but chiefly feed on fruits and leaves, ſometimes on inſects, though, for miſchief's ſake, they will often rob the neſts of birds of their eggs and young. They are themſelves the prey of ſerpents, which purſue them to the trees and ſwallow them entire. They are alſo devoured by leopards and ſimilar beaſts of prey. Some ſpecies are eaten by the natives of the countries where they are found.

Theſe animals are almoſt confined to the torrid zone, and, in particular, the woods of Africa, from Senegal to the Cape, and from thence to Ethiopia, are crowded with them. They are found in all parts of India, and its iſlands, in the ſouth of China, in Cochin-China and Japan; and they ſwarm in the foreſts of South America, from the iſthmus of Darien to Paraguay.

In ſome parts of India monkeys are objects of worſhip to the natives, and magnificent temples are erected in honour of them (B). In theſe countries they frequently come in vaſt numbers into the cities, and enter the houſes without moleſtation. In Amadabad, the capital of Guzarud, there are three hoſpitals for animals, where lame and ſick monkeys, and ſuch as, though well, chooſe to dwell there, are fed and cheriſhed. Twice a week the monkeys of the neighbourhood aſſemble ſpontaneouſly in the ſtreets of this city, mount on the houſes which are flat-roofed, and lie here during the great heats. On theſe days the inhabitants take care to leave for them rice, millet, or fruit; and if by any accident they omit to do this, the diſappointed animals become furious, break the tiles, and do other miſchief.

From the great number of ſpecies, it has been found convenient to diſtribute them into three ſubdiviſions, viz. thoſe of apes, baboons, and monkeys. We ſhall enumerate the ſpecies under each of theſe ſubdiviſions, with their ſpecific characters, and ſhall then give a brief account of ſome of the moſt remarkable individuals.

A. APES, deſtitute of tails. In this ſubdiviſion are reckoned 4 ſpecies, viz. Apes.

1. *S. Satyrus*, Oran Otan, or Wild Man of the Wood. Tailleſs, either cheſnut colour or black, without calloſities behind, and with the hair on the lower parts of the arms reverſed.—2. *S. Lar*, Great Gibbon or long-armed A. Tailleſs, uſually black, without calloſities behind, and with arms as long as the body.—3. *S. Inuus*, Magot or Barbary A. Tailleſs; pale brown, with calloſities behind and an oblong head.—4. *S. Sylvanus*, Pigmy. Tailleſs, pale brown, with calloſities behind, and a roundiſh head. 26

B. BABOONS. Tails commonly ſhort, bodies muſcular. In this there are 16 ſpecies, viz. Baboons.

5. *S. Sphinx*, Common B. Short-tailed; brown, with calloſities behind, with dull fleſh-coloured face and pointed nails.—6. *S. Mormon*, Mantegar, or Great B. Short-tailed; tawney brown, with calloſities behind, naked tumid, violet blue cheeks, obliquely furrowed, and the middle of the noſe blood red.—7. *S. Maimon*, Mandril or Ribbed-noſe B. Short-tailed, olive brown, with calloſities behind; naked violet blue furrowed cheeks, and the middle of the noſe fleſh coloured.—8. *S. Porcaria*, or Hog-faced B. Short-tailed, brown, covered behind, with black naked hog-like face and pointed nails.—9. *S. Sylvicola*, Wood B. Short-tailed; fleſhy brown, with calloſities behind, and with black naked face, hands, and feet.—10. *S. Sublutea*, Yellow

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(B) When the Portugueſe got poſſeſſion of the iſland of Ceylon, they found in one of the temples dedicated to these animals, a golden caſket containing the tooth of a monkey, which the natives held in such veneration, that they offered to redeem it at no leſs a price than 700,000 ducats. The viceroy, however, ordered it to be burned; but, ſome years afterwards, a [illegible] having procured a ſimilar tooth, pretended that it was the old one, [illegible] rejoiced at the recovery of their loſt treaſure, that they purchaſed it at [illegible] of our money.

[illegible] P. Short-tailed; yellow, freckled with black, [illegible] on the upper [illegible].—11. S. C[illegible], C[illegible] B. [illegible], with the [illegible] [illegible] pale [illegible].—12. S. [illegible], Broad toothed B. [illegible].—13. S. [illegible] B. Short-[illegible] brown, with calloſities behind, [illegible].—14. S. [illegible] B. [illegible].—15. S. [illegible] C[illegible] B. [illegible] black, with [illegible].—16. S. [illegible] B. [illegible]; yellowiſh, without calloſities behind, with [illegible] the fingers [illegible].—17. S. H[illegible], Dog-faced B. [illegible], with calloſities behind: [illegible] claws, and the hair on each ſide of the head very long.—18. S. Ferox, Lion-tailed B. Tailed; black, with very large whitiſh ſpreading beard.—19. S. Cynoſuros. Pale brown, beardleſs, with calloſities behind, and with longiſh fleſh-coloured face; [illegible].—20. S. [illegible] B. Short-tailed, [illegible]; [illegible], with [illegible]-coloured face, and large blood-red wrinkled calloſities behind.

C. MONKEYS. Tails generally long. This ſubdiviſion contains 42 ſpecies, viz.

21. *S. Leonina*, Leonine Monkey. Black, with calloſities behind, very large whitiſh beard, and very long [illegible] tail.—22. *S. C[illegible]*, H[illegible] lipped M. Long-tailed, beardleſs, with calloſities behind, riſing bifid noſtrils, and arched tail.—23. *S. Veter*, Purple-faced M. Long-tailed; white, with black beard.—24. *S. Roloway*, Roloway or Raloure M. Short-tailed, black-[illegible], with [illegible] face, [illegible] white [illegible] beard.—25. *S. D[illegible]*, Diana or [illegible] M. Long-tailed, blackiſh, freckled with white; the hair of the forehead and beard growing in a pointed form, with a lunated band acroſs the forehead.—26. *S. Naſuta*, Long-noſed M. Long tailed, [illegible]; pale aſh-coloured beneath, [illegible] naked fleſh-coloured face.—27. *S. F[illegible]*, Yellowiſh M. Long tailed, bearded, cinereous; yellow, with black face and ears.—28. *S. Sabæa*, Green M. Long-tailed, yellowiſh gray, with black face, and calloſities behind.—29. *S. Æthiops*, Mangabey or White-eyelid M. Long-tailed, beardleſs, with black face; white eyelids, white frontal band, and the hair on the forehead upright.—30. *S. C[illegible]*, M[illegible] M. Long-tailed, [illegible], whitiſh beneath, with bearded [illegible] yellowiſh crown; red eyelids, and whitiſh [illegible].—31. *S. N[illegible]*, White-noſed M. Long-tailed, beardleſs, black, freckled with white; the thumb of the hands very ſhort, and no calloſities behind.—32. *S. Talapoin*. Long-tailed, [illegible]; bearded cheeks, and black ears, noſe, and ſoles.—33. *S. M[illegible]*, N[illegible] M. Long-tailed, bearded, with ſwarthy fleſh-coloured face and breaſt, and blackiſh beard.—34. *S. Aygula*, Egret M. Long-tailed, beardleſs; gray, with a riſing longitudinal tuft on the crown.—35. *S. Rubra*, Red M. Long tailed, red pale aſh-coloured beneath, with bearded cheeks, and a black or white [illegible].—36. *S. [illegible]*, C[illegible] M. Beardleſs, pale brown, with the [illegible].—37. *S. [illegible]*, [illegible] M. [illegible].—38. *S. [illegible]*, [illegible] M. [illegible].—39. *S. [illegible]*, [illegible] M. [illegible].—40. *S. [illegible]*, [illegible] M. [illegible].—41. *S. [illegible]maus*, Cochin China M. Long-tailed, with bearded [illegible].—42. *S. [illegible]*, [illegible] M. [illegible].—43. *S. Hircina*, Goat M. Long tailed, brown, with blue [illegible].—44. *S. [illegible]*, [illegible] M. L[illegible], black, with very long ſpreading whitiſh hair on the head, and white tail.—45. *S. Ferruginea*, Bay M. Long-tailed, ruſty, with black limbs and tail.—46. *S. Annulata*, Annulated M. Ruſty brown, [illegible], with [illegible] tail, [illegible] than the body.—47. *S. P[illegible]*, [illegible] M. Blackiſh brown, with the [illegible] and very buſhy tail.—48. *S. Iacchus*, Striated M. Long-tailed, with ſpreading hairy ears; crooked hairy tail and ſharp claws, thoſe on the thumb being rounded.—49. *S. Oedipus*, Red tailed M. Long, red-tailed, beardleſs, with the hair of the head ſpreading downwards, and [illegible].—50. *S. [illegible]*, [illegible] M. [illegible]ed, ſilky hair, with long hair on the head; yellow body, [illegible].—51. *S. Nudus*, Great-eared M. Long-tailed, black, with [illegible].—52. *S. [illegible]*, Fair M. [illegible], beardleſs, white, with red face and brown tail.—53. *S. Beelzebul*, Preacher M. Bearded, black, the feet and [illegible]; tail prehenſile.—54. *S. Seniculus*, Royal M. Long-tailed, bearded red; tail prehenſile.—55. *S. Paniſcus*, Four-fingered M. Long-tailed, bearded, black, with four-fingered feet; tail prehenſile.—56. *S. Fatuellus*, Horned M. Long-tailed, beardleſs, with two horns like tufts on the head; tail prehenſile.—57. *S. Trepida*, Fearful M. Long-tailed, beardleſs, with upright hair on the head, and [illegible]; tail prehenſile.—58. *S. [illegible]*, [illegible] M. Long-tailed, beardleſs; brown body, black feet, and without calloſities,; tail prehenſile.—59. *St Capucina*, Capuchin M. Long-tailed, beardleſs, without calloſities, with black crown and limbs, and hirſute prehenſile tail.—60. *S. Sciurea*, Squirrel M. Long-tailed, yellowiſh gray, beardleſs, with orange-coloured [illegible] pointed.—61. *S. Antiguenſis*, Antigua M. Blackiſh brown, white beneath, with black limbs and face, bearded cheeks, and brown prehenſile tail.—62. *S. Morta*, Naked-tailed M. Long-tailed, beardleſs, brown, [illegible].

[illegible] Order VIII. [illegible] It is generally believed by naturaliſts, that the animals which have been deſcribed under the names given above, [illegible] each other in ſize, colour, ſex, and ſome other trifling [illegible].

have been deſcribed by authors of repute; one by our countryman Tyſon; another by Profeſſor Allamand; a third by Voſmaer; and a fourth by Edwards.

The oran otan is ſaid ſometimes to have attained the height of ſix feet: the ſpecimens brought into Europe have ſeldom exceeded the half of that ſtature. His ſtrength, however, is very great; and, in his native foreſts, it is ſaid that the moſt muſcular man is by no means a match for him. His colour is uſually a duſky brown; almoſt the whole body, except the feet and palms of the hands, is covered with hair: but in ſome varieties the face is ſaid to be nearly as bare as the human. Indeed there is no animal which bears ſo ſtrong a reſemblance to man as this ſpecies. His hands, feet, and face are almoſt exactly human; and, to a ſuperficial obſerver, many others of its features ſo nearly reſemble thoſe of man, that he has been conſidered, by ſome writers, as man in his rudeſt and moſt uncultivated ſtate. On a cloſer examination, however, it has been found, that there are marks of diſtinction ſufficiently ſtrong to overturn an opinion ſo humiliating to the lords of the creation, and to demonſtrate, that even in anatomical ſtructure this animal differs as much from the moſt ſavage of the human ſpecies, as the latter does in point of ſagacity and reaſoning powers from the moſt cultivated European. The noſe of the oran otan is flatter, and his mouth wider, than that of the Negro; his forehead is more oblique; his chin has no elevation at the baſe; his eyes are much nearer each other, and the diſtance betwixt the noſe and the mouth is much greater than in man. He has alſo no calves to his legs, and, though he ſometimes walks on two, it is pretty certain that this attitude is not natural to him. Buffon has aſſerted that theſe animals always walk upright, and has made this circumſtance one of the diſtinguiſhing characters of his diviſion of apes. It is now, however, generally underſtood, that this aſſertion is too haſty; and it is the opinion of thoſe moſt capable of judging, that the oran otan, like all other animals except man, was intended by nature to walk on all fours. See MAN.

On the whole it appears that there are two principal varieties of this ſpecies; one of which has been diſtinguiſhed by the name of pongo, or great oran otan, and the other has been called jocko. The following account is given of the pongo by Battel. "This pongo is all proportioned like a man, but that he is more like a giant in ſtature than a man; for he is very tall, and hath a man's face, hollow-eyed, with long hair upon his brows. His face and ears are without hair, and his hands alſo. He differeth not from man but in his legs, for they have no calf. He goes always upon his legs, and carrieth his hands claſped on the nape of his neck when he goeth upon the ground. They ſleep in the trees and build ſhelters from the rain. They feed upon fruit that they find in the woods and upon nuts, for they eat no kind of fleſh. They cannot ſpeak, and have no underſtanding more than a beaſt. The people of the country, when they travel in the woods, make fires where they ſleep in the night; and in the morning when they are gone, the pongo will come and ſit about the fire till it goeth out; for they have no underſtanding to lay the wood together. They go many together, and kill many negroes that travel in the woods. Many times they fall upon the elephants, which come to feed where they be, and ſo beat them with their clubbed fiſts, and pieces of wood, that they will run roaring away from them. Thoſe pongoes are never taken alive, becauſe they are ſo ſtrong that ten men cannot hold one of them, but yet they take many of their young ones with poiſoned arrows. The young pongo hangeth on his mother's belly, with his hands claſped about her, ſo that when any of the country people kill any of the females, they take the young one, which hangeth faſt upon his mother *."

This is almoſt the only account which we have of the oran otan in its native ſtate. The other relations of its habits and manners are deſcriptive of it in a ſtate of captivity, and of theſe we ſhall preſent our readers with ſome of the moſt remarkable.

Mr Buffon gives us the following account of a jocko, which he ſaw in France. "The oran otan which I ſaw walked always on two feet, even when carrying things of conſiderable weight. His air was melancholy, his gait grave, his movements meaſured, his diſpoſition gentle, and very different from thoſe of other apes. He had neither the impatience of the Barbary ape, the maliciouſneſs of the baboon, nor the extravagance of the monkeys. It may be alledged (ſays our author) that he had the benefit of inſtruction; but the other apes, which I ſhall compare with him, were educated in the ſame manner. Signs and words were alone ſufficient to make our oran otan act; but the baboon required a cudgel, and the other apes a whip; for none of them would obey without blows. I have ſeen this animal preſent his hand to conduct the people who came to viſit him, and walk as gravely along with them as if he had formed a part of the company. I have ſeen him ſit down at table, unfold his towel, wipe his lips, uſe a ſpoon or a fork to carry the victuals to his mouth, pour his liquor into a glaſs, and make it touch that of the perſon who drank along with him. When invited to tea, he brought out a cup and ſaucer, placed them on the table, poured out the tea, and allowed it to cool before he drank it. All theſe actions he performed without any other inſtigation than the ſigns or verbal orders of his maſter, and often of his own accord. He did no injury to any perſon; he even approached company with circumſpection, and preſented himſelf as if he wanted to be careſſed. He was very fond of dainties, which every body gave him: and as his breaſt was diſeaſed, and he was affected with a teazing cough, this quantity of ſweet-meats undoubtedly contributed to ſhorten his life. He lived one ſummer in Paris, and died in London the following winter. He ate almoſt every thing, but preferred ripe and dried fruits to all other kinds of food. He drank a little wine, but ſpontaneouſly left it for milk, tea, or other mild liquors †."

Doctor Tyſon deſcribes the oran otan which was exhibited in London about the end of the ſeventeenth century as the moſt gentle and loving creature that could be. Thoſe that he knew on board the ſhip in which he was brought to England, he would come and embrace with the greateſt tenderneſs, and though there were other monkeys on board, it was obſerved that he would never aſſociate with any of them, but always avoided their company as of nothing akin to them. He was ſometimes dreſt in clothes of which he at length became very fond, would put on part of them without help, and carry the reſt in his hands to ſome of the

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* *Buffon by Smellie*, vol. viii.

† *Buffon*, ubi ſupra.

the company for their aſſiſtance. He would lie in bed, lay his head on the pillow, and pull up the bed clothes to keep himſelf warm *.

Pere [illegible] brought up an oran otan, which became ſo fond of him, that wherever he went it was always deſirous of accompanying him: whenever, therefore, he had to perform the ſervice of his church, he was obliged to ſhut it up in a room. Once, however, the animal eſcaped and followed the father to the church, where, mounting on the ſounding board above the pulpit, he lay perfectly ſtill till the ſermon commenced. He then crept to the edge of the board, and overlooking the preacher, imitated all his geſtures in ſo groteſque a manner, that the congregation was unavoidably cauſed to laugh. The father ſurpriſed and confounded at this ill-timed levity, reproved his audience for their inattention. The reproof failed in its effect; the congregation ſtill laughed, and the preacher in the warmth of his zeal redoubled his vociferations and his actions; theſe the ape ſo exactly imitated, that the congregation could no longer reſtrain themſelves, but burſt into a loud and continued laughter. A friend of the preacher at length ſtepped up to him, and pointed out the cauſe of this improper conduct; and ſuch was the arch demeanour of the animal, that it was with the utmoſt difficulty he could command his countenance and keep himſelf apparently ſerious, while he ordered the ſervant of the church to take the ape away.

Perhaps one of the moſt intereſting accounts of the oran otan is that given by Voſmaer, and with this we ſhall cloſe our hiſtory of this ſpecies.

See Fig. 1. Plate CCCI.

"This animal (ſays M. Voſmaer) was a female; its height was about two Rhenish feet and a half. It ſhewed no ſymptoms of fierceneſs or malignity, and was even of a ſomewhat melancholy appearance. It was fond of being in company, and ſhowed a preference of thoſe who took daily care of it, of which it ſeemed to be ſenſible. Often when they retired, it would throw itſelf on the ground, uttering lamentable cries, and tearing in pieces the linen within its reach. Its keeper having ſometimes been accuſtomed to ſit near it on the ground, it took the hay of its bed, and laid it by its ſide, and ſeemed by every demonſtration to invite him to be ſeated near. Its uſual manner of walking was on all fours, like other apes, but it could alſo walk on its two hind feet only. One morning it got unchained, and we beheld it with wonderful agility aſcend the beams and rafters of the building; it was not without ſome pains that it was retaken, and we then remarked an extraordinary muſcular power in the animal, the aſſiſtance of four men being neceſſary to hold it in ſuch a manner as to be properly ſecured. During its ſtate of liberty it had among other things taken a cork from a bottle of Malaga wine, which it drank to the laſt drop, and had ſet the bottle in its place again. It ate almoſt every thing which was given to it; but its chief food was bread, roots, and eſpecially carrots, all ſorts of fruits, eſpecially ſtrawberries; and it appeared extremely fond of aromatic plants, and of the leaves and roots of parſley. It alſo ate meat, both boiled and roaſted, as well as fiſh. It was not obſerved to hunt for inſects like other monkeys, was fond of eggs, which it broke with its teeth, and ſucked completely; but fiſh and roaſted meat ſeemed its favourite food. It had been taught to eat with a ſpoon and a fork. When preſented with ſtrawberries on a plate, it was extremely pleaſant to ſee the animal take them up one by one with a fork, and put them into its mouth, holding at the ſame time the plate in the other hand. Its common drink was water, but it alſo very willingly drank all ſorts of wine, and particularly Malaga. After drinking, it wiped its lips; and after eating, if preſented with a toothpick, would uſe it in a proper manner. I was aſſured (continues our writer), that on ſhipboard it ran freely about the veſſel, played with the ſailors, and would go like them into the kitchen for its meſs. At the approach of night, it lay down to ſleep, and prepared its bed by ſhaking well the hay on which it ſlept, and putting it in proper order, and laſtly covering itſelf with the coverlet. One day ſeeing the padlock of its chain opened with a key, and ſhut again, it ſeized a little bit of ſtick, and put it into the key-hole, turning it about in all directions, endeavouring to ſee whether the padlock would open or not. This animal lived ſeven months in Holland. On its firſt arrival it had but very little hair except on its back and arms; but on the approach of winter it became extremely well covered; the hair on the back being three inches in length. The whole animal then appeared of a cheſnut colour; the ſkin of the face, &c. was of a mouſe colour, but about the eyes and round the mouth, of a dull fleſh colour." It came from the iſland of Borneo, and was after its death depoſited in the muſeum of the prince of Orange.

Inu[illegible] Bar[illegible] Ape Fig.

3. *S. Inuus.* Magot, Barbary Ape.—This ſpecies is conſidered by ſome naturaliſts as forming the connecting link between the ape, properly ſo called, and the baboons. Like the latter it has poſterior calloſities, and though it properly has no tail, it is furniſhed with an appendage of ſkin in the place where the tail is ſituated in other ſpecies. The hair on the greateſt part of its body is of a greeniſh brown, the belly being paler than the reſt; the face is of a ſwarthy fleſh-colour, and the fingers and toes are furniſhed with nails reſembling thoſe of the human ſpecies.

It is found moſt commonly in Barbary and ſome other parts of Africa as far as the Cape of Good Hope, and it is alſo occaſionally met with in Tartary, in Arabia, and in ſome parts of the Indian peninſula.

It is probable that Tavernier alludes to this ſpecies, in the account he gives of a cuſtom amongſt ſome of the inhabitants of India of amuſing themſelves at the expence of the ape. Theſe people place five or ſix baſkets of rice, forty or fifty yards aſunder, in an open ground near their retreat, and by every baſket put a number of ſtout cudgels, each about two feet long; they then retire to ſome hiding place not far diſtant, to wait the event. When the apes obſerve no perſon near the baſkets, they ſoon deſcend in great numbers from the trees, and run towards them: they grin at each other for ſome time before they dare approach; ſometimes they advance, then retreat ſeeming much diſinclined to encounter. At length the females, which are more courageous than the males, eſpecially thoſe that have young ones (which they carry in their arms as women do their children), venture to approach the baſkets, and as they are about to thruſt their heads in to eat, the males on the one ſide advance to hinder them. Immediately the other party comes forward; and the feud being kindled on both ſides, the combatants ſeize the

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cudgels, and commence a moſt ſevere fight, which always ends with the weakeſt being driven into the woods, with broken heads and limbs. The victors, he tells us, then fall to in peace, and devour the reward of their labour.

Of all the apes this agrees beſt with the temperature of an European climate, and may eaſily be kept in a ſtate of domeſtication. Buffon had one which he kept for ſeveral years. In ſummer he delighted to be in the open air, and in winter he appeared ſufficiently comfortable in a room without a fire, which ſhowed he was by no means delicate. He was always of a grave deportment, and ſometimes dirty in his manner. His movements were briſk, and his countenance rather ugly than ridiculous. When agitated with paſſion, he exhibited and grinded his teeth. He filled the pouches of his cheeks with the food which was given him, and generally ate every thing except raw fleſh, cheeſe, and whatever had undergone a kind of fermentation. When about to ſleep, he loved to perch upon an iron or wooden bar. He was always chained, becauſe though he had been long in a domeſtic ſtate he was not civilized, and had no attachment to his maſters. He ſeems to have been ill educated, for Buffon had ſeen others of the ſame ſpecies more intelligent, more obedient, more gay, and ſo docile as to learn to dance and make geſticulations in cadence, and to allow themſelves peaceably to be clothed.

The fleſh of this ſpecies is uſed as food by the wild Arabs.

Sylvanus, Pigmy. Fig. [illegible]

4. *S. Sylvanus.* *Pitheque.* Pigmy.—This ſpecies greatly reſembles the laſt, except that its head is rounder, and that it is much inferior in ſize, being ſeldom larger than a cat. It is thought by Mr Pennant to be the pigmy of the ancients; or one of that nation which was by them ſuppoſed to carry on periodical wars with the cranes. It is a native of Africa, and is alſo found in the Eaſt Indies and in Ceylon. They aſſociate in troops, and live chiefly on vegetable food. They are often found walking erect. They are ſaid to be very malicious and ſpiteful.

We are told by Marmol that they go in troops into the gardens or fields; but before they leave the thickets, one of them aſcends an eminence from which he views the country; and when he ſees no perſon, he gives the ſignal by a cry for the reſt to proceed, and removes not from his ſtation as long as they continue abroad: but whenever he perceives any perſon approaching, he ſcreams with a loud voice, and by leaping from tree to tree they all fly to the mountains. Their flight is worthy of admiration; for the females, though they carry four or five young ones on their backs, make great ſprings from branch to branch. Though extremely cunning, vaſt numbers of them are taken by different arts. When wild they bite deſperately, but by careſſes they are eaſily tamed. They do much miſchief to the fruits and corn; for they gather it together in heaps, cut it, and throw it on the ground whether it be ripe or not, and deſtroy more than they eat or carry off. Thoſe who are tamed perform things incredible, and imitate every human action.

They chiefly reſide in caverns, which gives the natives an eaſy opportunity of taking them alive. For this purpoſe the natives place veſſels containing intoxicating liquors in the caverns frequented by the apes, and theſe animals aſſemble together to drink theſe liquors. After having become intoxicated, they fall aſleep, and are eaſily taken by the hunters.

31
Sphinx, Great Baboon. Fig. 4.

5. *S. Sphinx.* Great baboon. *Papion.* *Motled baboon.*—This is a very large ſpecies, meaſuring when ſitting on its poſteriors, three or four feet high. It is very ſtrong and muſcular, eſpecially towards the fore parts of the body; but its waiſt, as is common to all the baboons, is ſlender. All the nails are not pointed, thoſe on the thumbs and great toes being rounded. The tail is ſhort and thick, and rounded; the poſteriors are perfectly bare and callous, and of a red colour.

The baboon is a native of Borneo, and of the hotteſt parts of the African continent. It lives chiefly on vegetables, but is ſaid to be very fond of eggs. The female brings forth one young at a time, and carries it in her arms.

From the great ſize and ſtrength of theſe animals they are not a little formidable; and as their natural diſpoſition is very ferocious, it is dangerous to encounter any number of them in their native wilds.

The baboons are paſſionately fond of raiſins, apples, and in general of all fruits which grow in gardens. Their teeth and paws render them formidable to dogs, who overcome them with difficulty, unleſs when eating has made them heavy and inactive. Buffon has remarked that they neither eat fiſh nor fleſh, except when boiled or roaſted, and then they devour both with avidity. In their expeditions to rob orchards, gardens, or vineyards, they generally go in troops. Some of them enter the incloſure, while others remain on the walls as ſentinels to give notice of any approaching danger. The reſt of the troop are ſtationed without the garden, at convenient diſtances from each other, and thus form a line, which extends from the place of pillage to that of their rendezvous. Matters being diſpoſed in this manner, the baboons begin the operation, and throw to thoſe on the wall melons, gourds, apples, pears, &c. Thoſe on the walls throw theſe fruits to their neighbours below; and thus the ſpoils are handed along the whole line, which generally terminates on ſome mountain. They are ſo dexterous and quick-ſighted, that they ſeldom allow the fruit to fall in throwing it from one to another. All this is performed with profound ſilence and great deſpatch. When the ſentinels perceive any perſon, they cry, and at this ſignal the whole troop fly off with aſtoniſhing rapidity.

In confinement the great baboon loſes nothing of his native ferocity. He is indeed one of the moſt unmanageable of his tribe, grinding his teeth, putting on a threatening aſpect, and ſhaking the bars of his cage ſo as often to make the ſpectators tremble. Mr Smellie ſpeaks of one that he ſaw at Edinburgh in 1779, that was remarkable for its ſize, ſtrength, and beautiful colours. He was nearly five feet high, and was exceſſively fierce, preſenting uniformly to the ſpectators a moſt threatening aſpect, and attempting to ſeize every perſon that came within the length of his chain. On ſuch occaſions he made a deep grunting noiſe, and was perpetually toſſing up his head. This ſeems to have been the ſame animal that is deſcribed by Mr Pennant as having been ſeen by him at Cheſter about two months after the time mentioned by Mr Smellie. He was particularly fond of cheeſe; his voice was a kind of roar not unlike that of a lion, but low and ſomewhat inward.

It

Primates. It went on all fours, and never ſtood on its hind legs unleſs forced to do ſo by its keeper. He would frequently ſit on his rump in a crouching poſture, and drop his hands before his belly *.

* Smellie's Buffon, vol. viii.

It is not a little extraordinary that an animal of this diſpoſition ſhould be kept in private houſes as a pet, eſpecially when we conſider the miſchiefs that they often commit. Dr Goldſmith ſays that he has ſeen one of them demoliſh a whole ſervice of china, without appearing in the leaſt conſcious of having done amiſs, though the miſchief was evidently intentional.

32 Nemeſtrina. Pig-tailed Baboon.

14. *S. Nemeſtrina.* Pig-tailed baboon.—Olive brown, with ſhort naked tail.

This is but a ſmall ſpecies, ſeldom exceeding the ſize of a cat. The tail exactly reſembles that of a pig. It is a native of Sumatra, and is very lively and active. He is ſometimes ſeen in an exhibition in this country, but ſeldom lives long in a climate ſo much colder than his own.

Mr Edwards had a male of this ſpecies: it lived with him for a year, and was about the ſize of a common houſe cat. Another of the ſame ſpecies being at that time exhibited at Bartholomew fair in London, Mr Edwards carried his to compare with it; and he remarks that they ſeemed highly pleaſed with each others company, though this was the firſt time of their meeting.

33 Beelzebul. Preacher Monkey. Fig. 5.

53. *S. Beelzebul.* Preacher monkey.—This ſpecies is found in great numbers in the woods of South America, eſpecially in Guiana and Braſil. It is the largeſt of the American monkeys, being about the ſize of a fox, and of a gloſſy black colour. There is in the throat of this animal a hollow bony ſubſtance, which is ſuppoſed to produce that peculiar dreadful howl for which this animal and the next ſpecies are ſo remarkable. They are exceedingly miſchievous and ſpiteful, and if attacked they bite cruelly. They uſually keep together in parties of from 20 to 30, rambling over the tops of the trees, and leaping with great agility from one tree to another. If they ſee any one approach alone, they always teaze and threaten him.

Marcgrave informs us that they aſſemble every morning and evening in the woods of Brazil, and make a moſt dreadful howling. Sometimes one of them mounts on a higher branch, and the reſt ſeat themſelves beneath: the firſt begins, as it were to harangue, and ſets up a howl ſo loud and ſharp as to be heard to a great diſtance: after a while, he gives a ſignal with his hand, when the whole aſſembly joins in chorus; but on another ſignal they are again ſilent, and the orator finiſhes his addreſs. Their clamour is the moſt diſagreeable and tremendous that can be conceived.

They are extremely ſagacious; and when hunted, not only diſtinguiſh particularly thoſe who are active againſt them, but defend themſelves vigorouſly when attacked. When the hunters approach, the monkeys aſſemble together, uttering loud and fearful cries, and throwing at their aſſailants dried branches which they wrench from the trees. It is ſaid that they never abandon each other, and that in paſſing from tree to tree they fling themſelves headlong from one branch to another without ever falling to the ground, always catching hold either with their hands or tail. If they are not at once ſhot dead it is ſcarcely poſſible to take them, as, though mortally wounded, they cling ſo firmly to the trees as to maintain their hold even after death.

[illegible]

Gen. 2. LEMUR. Maucauco.

Lemur.

Four front teeth in the upper jaw, the intermediate being remote; ſix in the lower jaw, longer, ſtretched forwards, compreſſed, parallel and approximated. Canine teeth ſolitary and approximated. Grinders ſublobated, the foremoſt of them being rather longer and ſharper than the reſt.

The animals of this genus reſemble the monkey tribe in the uſe of their hands, but they are much leſs miſchievous and ferocious than that tribe. None of them, except the *indri*, bears any reſemblance to man; but in this ſpecies the arms, hands, body, and feet, are very ſimilar to the human. A few of them are tailleſs, but moſt of them have long tails.

They are harmleſs inoffenſive creatures, live chiefly in woods, and feed on fruits, vegetables, or inſects. At leaſt one ſpecies, viz. the 12th, ſerves for food to the natives of the countries where it is found.

There are 13 ſpecies which are diſtinguiſhed by the following names and characters:

1. *Lemur Tardigradus.* Slow Lemur. Tailleſs; of a ruſty aſh colour, with a brown dorſal line; very ſmall ears.—2. *L. Loris.* Loris. Tailleſs; of a ruſty aſh colour, with extremely ſlender limbs, and large ears.—3. *L. Indri.* Indri. Tailleſs; black grayiſh beneath, with the face and ſpace round the anus whitiſh.—4. *L. Potto.* Potto. Tailed; fulvo-ferruginous.—5. *L. Mongoz.* Mongooz or Woolly L. Long-tailed; gray brown.—6. *L. Macaco.* Ruffed L. Tailed; black, with the neck bearded like a ruff.—7. *L. Laniger,* Flocky L. Tailed; pale tawney, white beneath, with ruſty tail.—8. *L. Catta.* Ring-tailed L. Tail long, and annulated with black and white.—9. *L. Bicolor.* Heart-marked L. Long-tailed; blackiſh white beneath, with a white heart-ſhaped ſpot on the forehead.—10. *L. Tarſier.* Tarſier. Long-tailed; aſh-coloured; with ſlender almoſt naked tufted tail; and very long hinder feet.—11. *L. Murinus.* Tail long, and ruſty; body aſh coloured.—12. *L. Galago.* Whitiſh L. Tail long and ruſty; body whitiſh, gray beneath.—13. *L. Pſilodactylus.* Long-fingered L. Aſh-ferruginous, with extremely villoſe tail, and the middle finger of the hands very long and naked.

Lemur Tardigradus, Slow Lemur. Fig. 7.

1. *L. Tardigradus.* Slow Lemur.—This animal is about the ſize of a ſmall cat, with the body of an elegant pale brown or mouſe colour; a flattiſh face, extremely prominent eyes, that are ſurrounded with a circle of dark brown, and a ſharpiſh noſe. Of its manner in its native ſtate we know almoſt nothing, but in a ſtate of domeſtication it has been accurately obſerved.

The late Sir William Jones had one of theſe animals in his poſſeſſion for ſome time, and has given a very intereſting account of its form and manners. This was publiſhed in the Aſiatic Reſearches, from which we ſhall extract the moſt intereſting particulars.

"In his manners he was for the moſt part gentle, except in the cold ſeaſon, when his temper ſeemed wholly changed; and his Creator who made him ſo ſenſible to cold, to which he muſt often have been expoſed even in his native foreſts, gave him probably for that reaſon [illegible]

[illegible]

his thick fur, which we rarely ſee in animals in theſe tropical climates: to me, who not only conſtantly fed him, but bathed him twice a-week in water accommodated to the ſeaſons, and whom he clearly diſtinguiſhed from others, he was at all times grateful; but when I diſturbed him in winter, he was uſually indignant, and ſeemed to reproach me with the uneaſineſs which he felt, though no poſſible precaution had been omitted to keep him in a proper degree of warmth. At all times he was pleaſed with being ſtroaked on the head and throat, and frequently ſuffered me to touch his extremely ſharp teeth; but his temper was always quick, and when he was unſeaſonably diſturbed, he expreſſed a little reſentment, by an obſcure murmur, like that of a ſquirrel, or a greater degree of diſpleaſure by a peeviſh cry, eſpecially in winter, when he was often as fierce, on being much interrupted, as any beaſt of the woods.

"From half an hour after ſunriſe to half an hour before ſunſet, he ſlept without intermiſſion, rolled up like a hedgehog; and, as ſoon as he awoke, he began to prepare himſelf for the labours of his approaching day, licking and dreſſing himſelf like a cat; an operation which the flexibility of his neck and limbs enabled him to perform very completely: he was then ready for a ſlight breakfaſt, after which he commonly took a ſhort nap; but when the ſun was quite ſet he recovered all his vivacity.

"His ordinary food was the ſweet fruit of this country; plantains always, and mangoes during the ſeaſon; but he refuſed peaches, and was not fond of mulberries, or even of guaiavas: milk he lapped eagerly, but was content with plain water. In general he was not voracious, but never appeared ſatisfied with graſshoppers; and paſſed the whole night, while the hot ſeaſon laſted, in prowling for them: when a graſshopper, or any inſect, alighted within his reach, his eyes, which he fixed on his prey, glowed with uncommon fire; and having drawn himſelf back to ſpring on it with greater force, he ſeized the prey with both his fore paws, but held it in one of them while he devoured it. For other purpoſes, and ſometimes even for that of holding his food, he uſed all his paws indifferently as hands, and frequently graſped with one of them the higher parts of his ample cage, while his three others were ſeverally engaged at the bottom of it; but the poſture of which he ſeemed fondeſt was to cling with all four of them to the upper wires, his body being inverted; and in the evening he uſually ſtood erect for many minutes, playing on the wires with his fingers, and rapidily moving his body from ſide to ſide, as if he had found the utility of exerciſe in his unnatural ſtate of confinement.

"A little before daybreak, when my early hours gave me frequent opportunities of obſerving him, he ſeemed to ſolicit my attention; and if I preſented my finger to him, he licked or nibbled it with great gentleneſs, but eagerly took fruit when I offered it, though he ſeldom ate much at his morning repaſt: when the day brought back his night, his eyes loſt their luſtre and ſtrength, and he compoſed himſelf for a ſlumber of ten or eleven hours.

"My little friend was, on the whole, very engaging; and when he was found lifeleſs in the ſame poſture in which he would naturally have ſlept, I conſole myſelf with believing that he died without much pain, and lived with as much pleaſure as he could have enjoyed in a ſtate of captivity."

Primates.

Its pace is exceedingly ſlow, ſcarcely moving above ſix or eight yards in a minute; whence its name.

It is of conſiderable importance in a phyſiological point of view, to inveſtigate the ſtructure of theſe ſlow-moving animals, ſuch as the ſpecies juſt deſcribed, and the ſloth to be afterwards mentioned. An anatomical examination of the blood-veſſels in the limbs of this ſpecies by Mr Carliſle has thrown conſiderable light on the connection of ſlow motion with a particular diſtribution of the arteries in the ſlow-moving limbs; this diſtribution is thus deſcribed by Mr Carliſle. "Immediately after the ſubclavian has penetrated the axilla it is divided into 23 equal-ſized cylinders, which ſurround the principal trunk of the artery, now diminiſhed in ſize to an inconſiderable veſſel. Theſe cylindrical arteries accompany each other, and divide with the ulnar and radial branches, being diſtributed in their courſe upon the muſcles, each of which has one of theſe cylinders. The other branches, for example the radial and ulnar, proceed like the arteries in general, diſperſing themſelves upon the ſkin, the membranes, joints, bones, &c. in an arboreſcent form. The iliac artery divides upon the margin of the pelvis into upwards of twenty equal-ſized cylinders, ſurrounding the main trunk as deſcribed in the axillary artery. Theſe veſſels are alſo finally diſtricuted, as in the upper extremity; the cylinders wholly upon the muſcles and the arboreſcent branches on all the other parts. The carotid arteries do not divide the equal-ſized cylinders, but are diſtributed as in the generality of animals*."

Gen. 3. GALEOPITHECUS. *CALUGO*.

36 Galeopithecus.

Front teeth in the upper jaw wanting; in the lower ſix, ſhort, broad and pectinated. Canine teeth very ſhort, triangular, broad, ſharp and ſerrated. Grinders four, truncated, and muricated with conical protuberances. Flying-ſkin ſurrounding the body, limbs, and tail.

There is only one ſpecies, viz.

37 Volans, Flying Lemur. Fig. 8.

G. Volans. Flying Calugo, or Flying Lemur.—This is one of thoſe extraordinary quadrupeds whom nature has raiſed above their uſual element, and enabled them to tranſport themſelves through the air in a manner which, though it cannot ſtrictly be denominated *flying*, is at leaſt very ſimilar to it. The body of the flying lemur is about three feet long; but, except when the membrane is expanded, it is very ſlender. It has a ſlender tail, about a ſpan long. The membrane, which extends from the neck to the fore legs, hind legs, and tail, is covered with fur, but appears membranaceous on the inner ſide. The upper ſide of the animal is of a deep aſh colour, inclining to black when young, and the back is croſſed tranſverſely with blackiſh lines. Its head is long, its mouth ſmall, and its teeth differ from thoſe of every other quadruped hitherto examined. The cutting teeth in the lower jaw are deeply cut like a comb; the canine teeth, as Pallas calls them, (though Geoffroy thinks they are more properly cutting teeth), are triangular, very broad at the baſe, and very ſhort. The cæcum or large inteſtine is very voluminous.

It is a native of the Molucca and Philippine iſlands, frequents woody places, and feeds on fruits, and probably rimates. feeds on insects. It almost constantly resides on trees; in descending from which it spreads its membrane, and balances itself in a gentle manner towards the place at which it aims, but in ascending it uses a leaping pace. It brings forth two young, which are said to adhere to the breasts of the parent by their teeth and claws.

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* Shaw's Zoology, vol. i.

Geoffroy and Cuvier make two varieties or ſpecies of this genus, viz. *G. Rufus*, Red Calugo; and *G. Variegatus*, Varied Calugo:—but theſe are probably no more than ſexual differences.

18 [illegible]

Genus 4. Vespertilio. *Bats.*

Teeth erect, ſharp-pointed, and approximated; hands palmated; with a membrane ſurrounding the body, and enabling the animal to fly.

The animals of this genus have their atlantal extremities exceedingly long, eſpecially what may be termed the fingers; and the delicate membrane that is ſtretched over them is ſo contrived, as to form a wing when the animals wiſh to fly, and to fold up into a ſmall ſpace when they are at reſt. All the ſpecies have two breaſts, more or leſs conſpicuous, to which the young adhere. They have no cæcum.

The Bats are natives of very different regions; three of them are found in Britain, and ſeveral in the warmer regions of Aſia and Africa; one in the Weſt Indies, and a few in America. Thoſe of warm climates are uſually very large. Thoſe which inhabit the colder regions lie all winter in a torpid ſtate, without taſting nouriſhment. The ſmaller ſpecies live chiefly on inſects which they ſeize in their flight; but the larger attack birds, or even the leſſer quadrupeds.

From ſome experiments made by the abbé Spallanzani, on three ſpecies of this genus, it appears that theſe animals poſſeſs ſome additional ſenſe, by which they are enabled, when deprived of ſight, to avoid obſtacles as readily as when they retained the power of viſion. When the eyes of theſe bats were covered, or even entirely deſtroyed, they would fly about in a darkened room, without ſtriking againſt the walls, and would conſtantly ſuſpend their flight, when they came near a place where they could conveniently perch. In the middle of a dark ſewer that turned at right angles, they would, though at a conſiderable diſtance from the walls, regularly alter the direction of their flight with the greateſt nicety, when they came to the angles. When branches of trees were ſuſpended in the room in which they were flying, they always avoided them, and even flew betwixt threads hung perpendicularly from the ceiling, though theſe were ſo near each other that they were obliged to contract their wings in order to paſs through them.

Theſe experiments were repeated by Vaſſali at Turin, by Roſſi at Piſa, Spadon at Bologna, and Jurin at Geneva. M. Jurin conceives that no other of the five ſenſes could, in theſe inſtances, ſupply the place of ſight; and as, from ſome anatomical obſervations that he made on theſe animals, he found a prodigious number of nerves expanded on the upper jaws, the muzzle, and the organ of hearing, he conceived that thoſe nervous productions would account for the extraordinary faculty above deſcribed. From ſome obſervations made by Mr Carliſle on this ſubject, it appears probable that the ſenſe of hearing, which in the bat is uncommonly delicate, enables these animals when blinded, to avoid those objects which would impede their flight. This gentleman collected seven ſpecimens of the veſpertilio auritus or large-eared bat, and obſerved, that when the external ears of the blinded ones were folded, they hit againſt the ſides of the room, without being at all aware of their ſituation. They refuſed every ſpecies of food four days, and a larger number which were afterwards caught were preſerved in a dark box for above a week. During the day time they were extremely deſirous of retirement and darkneſs; and, while confined to the box, never moved or endeavoured to get out during the whole day; and, when ſpread on the carpet, they commonly reſted ſome minutes, and then beginning to look about, crawled ſlowly to a dark corner or crevice. At ſunſet the ſcene was quite changed: every one then endeavoured to ſcratch its way out of the box; a continued chirping was kept up; and no ſooner was the lid of their priſon opened, than each was eager to eſcape, either flying away immediately, or running nimbly to a convenient place for taking wing. When the bats were firſt collected, ſeveral of the females had young ones clinging to their breaſts, in the act of ſucking. One of them flew with perfect eaſe, though two little ones were thus attached to her, which weighed nearly as much as their parent. All the young were devoid of down, and of a black colour *.

Many of the larger ſpecies of bats attack men and other animals when aſleep, make a ſlight wound with their ſharp teeth ſo dexterouſly as not to awaken their victim, and then ſuck the blood. This property is attributed chiefly to one ſpecies, which we ſhall particularly notice preſently; but it is probably poſſeſſed by moſt of the larger bats that inhabit the warm climates.

Some of the ſpecies may be employed as food.

There are deſcribed about 24 ſpecies of Bats; and as they are ſo numerous, they may be diſtributed into two ſections, as the *tailed*, and the *tailleſs*.

A. Tailed Bats, of which there are 18; viz.

1. * *Veſpertilio murinus*, Common B. Noſe inappendiculated; ears ſhorter than the head.—2. * *V. Auritus*, Long-eared B. Noſe inappendiculated; ears larger than the head, and double.—3. *V. Noctula*. Noctule B. Noſe and mouth ſimple; oval ears and very ſmall valves.—4. *V. Ferrum equinum*, Horſe-ſhoe B. Noſe horſe-ſhoe ſhape; ears, valve leſſer; tail half as long as the body.—5. *V. Serotinus*, Serotine B. Yellowiſh, with ſhort emarginate ears.—6. *Pipiſtrellus*, Pipiſtrelle. Blackiſh brown, with convex front, and ovate emarginated ears, ſcarcely longer than the head.—7. *V. Barbaſtellus*, Barbaſtelle. Cheeks elevated, hairy; ears large, angulated below.—8. *Laſiopterus*, Laſiopter B. Membrane connecting the feet extremely broad, covered above with hair.—9. *V. Laſiurus*, Rough-tailed B. Lips tumid; tail broad and hairy.—10. *V. Cephalotes*, Molucca B. Yellowiſh gray, with large head; ſpiral noſtrils, ſmall valveleſs ears.—11. *V. Pictus*, Striped B. Noſe ſimple; ears funnel-ſhaped, appendiculated.—12. *Noveboracenſis*, New-York B. Tail long, hairy; noſe ſhort and ſharp; ears ſhort and round, with a white ſpot at the baſe of each wing.—13. *Hiſpidus*, Bearded B.—Hairy, with channelled noſtrils, and long narrow ears.—14. *V.* [illegible], Slouch-eared B. Noſe

hairy,

* [illegible]

blunt; ears large and pendent, with pointed tips.—15. *V. Lepturus*, Slender-tailed B. Nostrils tubular; tail slender, with a purse-shaped cavity on the inside of each wing.—16. *V. Nigrita*, Senegal B. Yellowish brown, with the forepart of the head, feet and tail black.—17. *V. Molossus*, Bull-dog B. Upper lip pendulous; tail stretching beyond the connecting membrane.—18. *V. Leporinus*, Peruvian B. Upper lip bifid.

B. TAILLESS BATS; of which there are 6; viz.

19. *V. Spaſma*, Cordated B. A double heart-ſhaped leaf-like membrane on the noſe.—20. *V. Soricinus*, Leaf B. Snout lengthened, furniſhed with a heart-ſhaped leaf-like membrane.—21. *V. Haſtatus*, Javelin B. Noſe furniſhed with a trefoil-ſhaped upright membrane—22. *V. Naſutus*, Great Serotine B. Ruſty, with long ſloping noſe, and long upright rounded ears.—23. *V. Spectrum*, Spectre B. Noſe furniſhed with a funnel-ſhaped pointed membrane.—24. *Vampyrus*, Vampyre B. Noſe without appendage; flying membrane divided between the thighs.

After having ſaid ſo much on the general ſtructure and habits of this genus, we ſhall briefly notice only two of the ſpecies.

2. Long-eared Bat. Fig. 9. Species 2. *V. Auritus*, Long-eared B.—This is one of the moſt common ſpecies of Britain, and may be ſeen flying through the air in the evenings of ſummer and autumn, in ſearch of inſects. It is about two inches long, and ſeven from the tip of one wing to that of the other. Its ears are half as long as its body, very thin, and almoſt tranſparent, and within each there is a membrane which probably ſerves as a valve to defend the organ of hearing during the inactive ſtate of the animal. Theſe bats are ſometimes taken by throwing up at them the heads of burdock whitened with flour. The animals either miſtaking theſe for prey, or accidentally ſtriking againſt them, are entangled by the hooked prickles, and brought to the ground. This is one of the ſpecies that remains in a torpid ſtate during winter. At the end of ſummer they retire to their hiding places in old buildings, walls, or caverns, where they remain, generally in great numbers, ſuſpended by the hind legs, and enveloped in their wings, till the genial warmth of ſummer again calls them forth. Theſe animals are ſaid to drink on the wing like ſwallows, and they love to frequent waters, partly for the ſake of drinking, and partly to prey on the inſects which hover over them. As Mr White was going pretty late on a warm ſummer's evening, in a boat on the Thames, from Richmond to Sunbury, he ſaw prodigious multitudes of bats between the two places; and he ſays, that the air ſwarmed with them all round the Thames, ſo that hundreds were in ſight at a time. Bats are ſuppoſed to produce two young at a birth, and theſe they ſuckle for a conſiderable time. The young, when recently born, adhere moſt tenaciouſly to the nipple of the parent, ſo as not to be removed without great difficulty.

This animal is capable of being to a certain degree domeſticated; and we are told by Mr White, that he was once much amuſed with the ſight of a tame bat. "It would, ſays he, take flies out of a perſon's hand. If you gave it any thing to eat, it brought its wings round before the mouth; hovering and hiding its head in the manner of birds of prey when they feed. The adroitneſs it ſhewed in ſhearing off the wings of flies (which were always rejected) was worthy of obſervation, and pleaſed me much. Inſects ſeemed to be moſt acceptable, though it did not refuſe raw fleſh when offered; ſo that the notion that bats go down chimneys, and gnaw people's bacon, ſeems no improbable ſtory. While I amuſed myſelf with this wonderful quadruped, I ſaw it ſeveral times confute the vulgar opinion, that bats, when down on a flat ſurface, cannot get on the wing again, by riſing with great eaſe from the floor. It ran, I obſerved, with more diſpatch than I was aware of, but in a moſt ridiculous and grotesque manner.*"

24. *Vampyrus*, Vampyre Bat. Fig. 10. Species 24. *V. Vampyrus*. Vampyre Bat.—This is one of the largeſt ſpecies, being about a foot long, and nearly four feet in the extent of its wings; it is ſometimes found even larger, and of the extent of ſix feet between the wings. Its colour is generally a deep reddiſh brown; its head is ſhaped like that of a fox, the noſe being ſharp and black, and the tongue pointed, and terminated by ſharp prickles. The ears are naked, flattiſh, and pointed; and in colour reſembling thoſe of the common bat. Theſe animals are ſaid not to be carnivorous, but live principally upon fruit; and are ſo fond of the juice of the palm tree, that they will ſuck it till they are intoxicated, and fall motionleſs to the ground. They often hang together in vaſt cluſters in hollow trees, or from the boughs of trees, and make a horrid noiſe. They are found in the Friendly iſlands, New-Holland, in South America, and in the Eaſt Indies.

Linnæus has given to this ſpecies the name *Vampyrus*, from the idea that this is the principal ſpecies that ſucks the blood of people when aſleep. It is not certain whether the bat by which Captain Stedman was attacked, while in Surinam, be this ſpecies; but his account of the accident is ſo diverting, that we ſhall give it in his own words. "I cannot here (ſays he) forbear relating a ſingular circumſtance reſpecting myſelf, viz. that on waking about four o'clock one morning in my hammock, I was extremely alarmed at finding myſelf weltering in congealed blood; and without feeling any pain whatever. Having ſtarted up, and rung for the ſurgeon, with a fire-brand in one hand, and all over beſmeared with gore; to which, if added, my pale face, ſhort hair, and tattered apparel, he might well aſk the queſtion,

'Be thou a ſpirit of health, or goblin damn'd,
Bring with thee airs from heaven, or blaſts from hell"

The myſtery, however, was, that I had been bitten by the *vampire* or *ſpectre* of Guiana, which is called the *flying-dog* of New Spain, and by the Spaniards, *perro volador*: this is no other than a bat of a monſtrous ſize, that ſucks the blood from men and cattle while they are faſt aſleep, even ſometimes till they die; and as the manner in which they proceed is truly wonderful, I ſhall endeavour to give a diſtinct account of it.—Knowing by inſtinct, that the perſon they intend to attack is in a ſound ſlumber, they generally alight near the feet, where, while the creature continues fanning with his enormous wings, which keeps one cool, he bites a piece out of the tip of the great toe, ſo very ſmall indeed, that the head of a pin could

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* White's Selborne.

Bruta. ſcarcely be received into the wound, which is conſequently not painful; yet through this orifice he continues to ſuck the blood, until he is obliged to diſgorge. He then begins again, and thus continues ſucking and diſgorging till he is ſcarcely able to fly, and the ſufferer has often been known to ſleep from time into eternity. Cattle they generally bite in the ear, but always on places where the blood flows ſpontaneouſly. Having applied tobacco aſhes as the beſt remedy, and waſhed the gore from myſelf and hammock, I obſerved ſeveral heaps of congealed blood all round the place where I had lain, upon the ground; on examining which, the ſurgeon judged that I had loſt at leaſt 12 or 14 ounces of blood during the night." *.

** Stedman's Narrative.*

The fleſh of this ſpecies is conſidered by the Indians as excellent food, and it is ſaid that the French reſidents ſometimes boil them in their bouillon *to give it a reliſh*.

From the general appearance and uſual time of flight of bats, they have always been looked on with a ſort of ſuperſtitious terror, and are commonly introduced as principal objects in thoſe awful ſcenes of haunted caſtles, and myſterious caverns, that have exerciſed the fancy of poets and romantic writers. The bat has been repreſented by the ancient epic poets as one of the inhabitants of that dreary vault that forms the entrance to the infernal regions; and it has from time immemorial lent its wings to decorate the ſhoulders of thoſe terrific figures under which the ingenious fancy of painters has repreſented imps and demons. Probably the fabulous harpies of the ancient poets may be traced to a ſimilar origin, as ſome of the larger bats may with a little poetical exaggeration, eaſily be converted into thoſe rapacious and filthy beings.

This firſt order contains four genera, and about 100 ſpecies.

CHAP. II. BRUTA.

41 Bradypus.

Genus 5. BRADYPUS. *SLOTHS.*

Cutting teeth wanting in both jaws; canine teeth ſingle, obtuſe, longer than the grinders, and placed oppoſite; grinders five on each ſide, obtuſe; fore legs by much the longer; claws very long.

The animals of this genus are called *ſloths*, as their movements, more eſpecially thoſe of one ſpecies, are very ſlow and ſluggiſh. There are but three ſpecies, two of which are natives of South America, and the third of India. They all live chiefly on vegetable food, and are mild harmleſs creatures. They are thus diſtinguiſhed.

1. *B. Tridactylus*, Three-toed S. Feet three-toed; tail ſhort.—2. *B. Didactylus*, Two-toed S. Tailleſs; fore feet two-toed.—3. *B. Urſinus*, Urſine S. Black, with very long ſhaggy hair; long ſnout, and five-toed feet.

We ſhall here give an account only of the firſt ſpecies, or the Three-toed S.

42 *Tridactylus*, Three toed Sloth. *Bradypus Tridactylus.* This animal is remarkable for its ſlow movements, affording almoſt a ſingular example of languid motion and habitual inactivity. The following account of it is given us by Kircher. "Its figure is (he ſays) extraordinary: it is about the ſize of a cat, has a very ugly countenance, and claws extended like fingers. It ſweeps the ground with its belly, and moves ſo ſlowly that it would ſcarcely go the length of a bow-ſhot in 15 days, though conſtantly in motion; hence it obtained the name of ſloth. It lives generally on the tops of trees, and employs two days in crawling up, and as many in getting down again. Nature has doubly guarded it againſt its enemies, firſt, by giving it ſuch ſtrength in its feet, that whatever it ſeizes, it holds ſo faſt, that it can never be freed, but muſt there die of hunger. 2dly, In having given it ſuch an affecting countenance, that when it looks at any one who might be tempted to injure it, it is almoſt impoſſible not to be moved with compaſſion; it alſo ſheds tears, and upon the whole perſuades one that a creature ſo defenceleſs and ſo abject ought not to be tormented.

History of the Species.

"To try an experiment with this animal, the provincial had one of them brought to the Jeſuit's college at Carthagena. He put a long pole under its feet, which it ſeized very firmly, and would not let go again. The animal, therefore, thus voluntarily ſuſpended, was placed between two beams, where it remained without food for 40 days, the eyes being always fixed on thoſe who looked at it, who were ſo affected that they could not forbear pitying its dejected ſtate. At length, being taken down, a dog was let looſe on it, this, after a while the ſloth ſeized in its claws, and held till he died of hunger."

The ſlowneſs of its motions is, in the above account greatly exaggerated, as we are informed by later writers that it will move fifty or ſixty paces in a day, and one that was on board ſhip climbed to the maſt head in about an hour.

In aſcending a tree, this animal firſt careleſsly ſtretches out one of its fore paws, and fixes its claws in the bark of the tree, as high as it can reach, then heavily raiſes its body, and gradually fixes its other paw, thus aſcending with the greateſt ſlowneſs and apparent difficulty. When got up into the tree, he continues there till he has deſpoiled it of every thing that can ſerve him for food, and then to ſave himſelf the trouble of a tedious and difficult deſcent, it is ſaid he ſuffers himſelf to drop from the tree upon the ground, being ſafe from any injury in the fall by his very tough and hairy ſkin. Here he remains till the calls of hunger again incite him to the arduous taſk of climbing another tree, when he proceeds in the ſame manner.

The female produces only one young, which ſhe frequently carries on her back. This animal is a native of the hotter parts of South America.

In Dr Shaw's deſcription of this ſpecies, it is remarked, that "the fore legs are *ſhort*, the hinder ones far longer." As this contradicts the generic character, and is different from the other deſcriptions that we have read of the three-toed ſloth, we ſuppoſe it to be an inadvertency, though Mr Bingley has copied the paſſage without remarking its incongruity.

The third ſpecies, or *urſine ſloth*, is the ſame animal that is figured in Mr Bewick's Hiſtory of Quadrupeds, p. 266, (2d edit.) and which was by him conſidered as a ſpecies of bear.

MEGATHERIUM Some years ago, there was diſcovered below the ſurface of the earth in South America, an entire foſſil ſkeleton of an animal at preſent unknown; but which M. Cuvier found to reſemble the 43 Megatherium.

preſent

preceding genus more than any other. From its vaſt ſize, Cuvier gave it the name of *megatherium*, (*megas*, *large*, *therion*, *beaſt*), and he has given the following deſcription of it in the "*Annales du Muſeum National*," accompanied with a figure.

"This ſkeleton is twelve feet (French) long, by ſix feet in height. The ſpine is compoſed of ſeven cervical, 16 dorſal, and four lumbar vertebræ; there are conſequently ſixteen ribs. The ſacrum is ſhort; the oſſa ilia very broad, and their plane being almoſt perpendicular to the ſpine, they form a very open pelvis. There is no pubis or iſchium, at leaſt they are wanting in this ſkeleton, and there is no mark of their having exiſted when the animal was alive.

"The thigh bones are exceſſively thick, and the leg bones ſtill more ſo in proportion; the entire ſole of the foot bore on the ground in walking; the ſhoulder blade is much broader than long; the clavicles are perfect, and the two bones of the fore arm are diſtinct and moveable upon each other; the fore limbs are longer than the hind. To judge by the form of the laſt phalanges, there muſt have been very large pointed claws, encloſed at their origin in a long ſheath. There appears to have been only three of theſe claws on the fore feet, and a ſingle one on the hind; the other toes ſeem to have been deprived of them, and, perhaps, entirely concealed beneath the ſkin.

"The head is the greateſt ſingularity of this ſkeleton; the occiput is elongated and flattened, but is pretty convex above the eyes; the two jaws form a conſiderable projection, but without teeth, there being only four on each ſide above and below, all grinders, with a flat crown, and grooved acroſs; the breadth of the branches of the lower jaw, and the great apophyſis placed on the baſe of the zygomatic arch, deſerve particular notice.

"This quadruped, in its characters, taken together, differs from all known animals, and each of its bones, conſidered apart, alſo differs from the correſponding bones of all known animals. This reſults from a detailed compariſon of the ſkeleton with that of other animals, and will readily appear to thoſe who are converſant in ſuch reſearches; for none of the animals which approach it in bulk have either pointed claws, or ſimilarly formed head, ſhoulder blades, clavicles, pelvis, or limbs [f]."

44 Myrmecophaga.

GENUS 6. MYRMECOPHAGA. *Ant eaters.*

Teeth wanting; tongue cylindrical and extenſile; mouth lengthened out ſo as to be ſomewhat of a tubular form; body covered with hair.

The *ant-eaters*, as their name imports, live chiefly on ants and ſimilar inſects, and for this purpoſe they are furniſhed with a very remarkable tongue, it being of great length and of a roundiſh or worm-like form, and covered with a very glutinous ſaliva. This tongue the animals thruſt into the neſts of the ants, &c. and when a ſufficient number of the inſects has adhered to it, they withdraw the tongue and ſwallow the prey. Though the want of teeth makes part of the generic character, it appears from the obſervations of M. Brouſſonet, that in moſt of the ſpecies there are certain bones or proceſſes not unlike teeth, ſituated at the entrance of the gullet, or rather, according to Camper, at the lower end of the jaws. The ant-eaters are confined to warm climates, and moſt of them have hitherto been found only in South America.

There are ſeven ſpecies deſcribed by Shaw, though Gmelin admits only five.

1. *M. Jubata*. Great A. Gray brown; with four toes on the fore feet, five on the hind; long ſnout, and very long buſhy tail.—2. *M. Tetradactyla*, Middle A. Four toes on the fore, and five on the hind feet, and half naked, prehenſile tail.—3. *M. Tridactyla*, Three-toed A. Three toes on the fore, and four on the hind feet, and villoſe tail.—4. *M. Didactyla*, Little A. Two toes on the fore, and four on the hind feet, and prehenſile tail.—5. *M. Capenſis*. Cape A. Four toes on the fore feet; long ſnout; large pendant ears; tail ſhorter than the body, and attenuated towards the tip.—6. *M. Aculeata*, Spiny A. Tail very ſhort.—7. *M. Striata*, Striped A. Yellowiſh, with tranſverſe duſky bands, and the upper jaw longer than the lower.

Of the above ſeven ſpecies, it is probable that the third is only a variety of the ſecond; and M. M. Cuvier and Geoffroy have placed the fifth in a new genus, *orychteropus*, (ſee p. 451) as it differs ſo conſiderably from the reſt. Moſt naturaliſts agree that the ſpines on the body of the ſixth entitle it, equally with the genus MANIS, to a ſeparate place in ſyſtematic arrangement. On the whole, from an extenſive conſideration of this tribe, M. La Cepede is of opinion that only three ſpecies ſhould be admitted into it, viz. the firſt, ſecond, and fourth. Of theſe the firſt and fourth are beſt known; the ſecond, or what Cepede calls *tamandua-i*, or *little tamandua*, has been well deſcribed by this naturaliſt in a memoir on the genus MYRMECOPHAGA, printed in the ſixth volume of "*Memoires de l'Inſtitut.*"

45 Manis.

GENUS 7. MANIS.

Teeth wanting; tongue cylindrical and extenſile: mouth lengthened into a narrow ſnout; body covered with ſcales.

This genus is nearly allied to the laſt, differing in little more than in the nature of the covering of the body, which in this is compoſed of large ſcales that are of a horny conſiſtence, and extremely ſtrong, conſtituting a ſuit of armour that is capable of defending the animals, when rolled up, againſt the attacks of the moſt ferocious enemies. The animals have the power of raiſing theſe ſcales; thus preſenting to the aſſailants a moſt formidable front. From ſome diſtant reſemblance to the lizard tribe (ſee ERPETOLOGY), the animals of this genus have been called *ſcaly lizards*, but they are more commonly known by the name of *pangolins*. They are harmleſs creatures, and feed on ſimilar food with the ant-eaters, taking it in the ſame manner. They are found in India and the Indian iſlands.

There are only two, or at moſt three ſpecies, viz. 1. *M. Tetradactyla*, Long tailed M, or Phatagin. Feet four-toed, and tail very long.—2. *M. Pentadactyla*, Short-tailed M, or *Pangolin*. Feet five-toed, and tail about as long as the body.—3. *M. Platurus*, Broad tailed M. Tail extremely broad.

It is doubtful whether the laſt be a diſtinct ſpecies, or only a variety, the effect perhaps of advanced age.

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[f] [illegible] Muſeum Nat.

Bruta.

So little is known of the habits and manners of these animals that we shall not dwell longer on them.

46 Dasypus or Armadillos.

Genus 8. DASYPUS. *Armadillos.*

Cutting and canine teeth wanting; grinders ſeveral; body covered with a ſhelly armour, divided into zones or bands.

The animals of this tribe are called *armadillos*, from the very ſingular *armour*, by which the upper part of their bodies is defended. This is compoſed partly of large irregular pieces covering the ſhoulders and rump, and partly of regular bands lying between theſe, and folding one over another, like the parts of a lobſter's tail, ſo as to accommodate themſelves to all the motions of the animal. The number of theſe bands varies in the ſeveral ſpecies; and though this circumſtance makes part of the ſpecific characters, it is doubtful whether it is ſufficiently conſtant or exact, as various authors have numbered them very differently. The armadillos reſemble each other ſo much in their habits and way of life, that a general account of them may ſuffice.

They are very harmleſs animals, and live retired in ſubterraneous retreats, which they burrow for themſelves by means of the large ſtrong claws with which their feet are furniſhed. They wander about chiefly by night, in ſearch of roots, grain, worms, inſects, and other ſmall animals; when attacked, they coil themſelves up in a ball like the pangolins, and are then invulnerable. They are ſaid to drink much, and often grow very fat. They are very prolific, breeding three or four times in a year, and producing ſeveral young at a birth. They are all natives of South America, and are conſidered as excellent food. The Indians hunt them with ſmall dogs trained for that purpoſe. When ſurpriſed, they run to their holes, or attempt to make a new one, which they do with great expedition, having ſtrong claws on their fore feet, with which they adhere ſo firmly to the ground, that if they ſhould be caught by the tail whilſt making their way into the earth, their reſiſtance is ſo great, that they will ſometimes leave their tails in the hand of their purſuers: to avoid this, the hunter has recourſe to artifice; and, by tickling the animal with a ſtick, it gives up its hold, and ſuffers itſelf to be taken alive. If no other means of eſcape be left, it rolls itſelf up within its covering, by drawing in its head and legs, and bringing its tail round them, as a band to connect them more forcibly together: in this ſituation it ſometimes eſcapes by rolling itſelf over the edge of a precipice, and generally falls to the bottom unhurt.

The moſt ſucceſsful method of catching armadillos is by ſnares laid for them by the ſides of rivers or other places which they frequent.

There are ſix ſpecies of armadillos, that are, as we have ſaid, chiefly diſtinguiſhed by the number of ſhelly bands that envelope the middle part of their body.

1. *Dasypus Tricinctus*, Three banded A. Armour divided into three bands, and five-toed feet.—2. *D. Sexcinctus*, Six-banded A. Six bands, and five-toed feet.—3. *D. Septemcinctus*, Seven banded A. Seven bands, and fore feet four-toed, hind feet five-toed.—4. *D. Novemcinctus*, Nine-banded A. Nine bands; fore feet four-toed, hind feet five-toed.—5. *D. 12-cinctus*, 12 banded A. Twelve bands.—6. *D. 18 cinctus*, Eighteen-banded A. Eighteen bands.

47 Rhinoceros.

Genus 9. RHINOCEROS.

Horn ſolid, perennial, conical, ſeated on the noſe.

There are at leaſt two ſpecies, viz. *R. Unicornis*, Single-horned R. with a ſingle horn, and 2. *R. Bicornis*, Two-horned R. with two horns.

As both ſpecies are remarkable, both for their form and habits, we ſhall deſcribe both pretty much at large.

48 *Unicornis*, Single-horned rhinoceros. Fig. 16.

1. *R. Unicornis*, Single-horned rhinoceros. This animal, if we except the elephant, is the largeſt of all terreſtrial animals, and in ſtrength and power it is exceeded by none. It is generally about 12 feet long, and nearly as many in the circumference of its body. Its whole form is very awkward and clumſy; its head is large and long; its back ſinks in conſiderably, and its ſkin is puckered up into ſeveral folds, giving the animal the appearance as if it were inveſted with a coat of mail. The upper lip hangs over the lower in the form of a lengthened tip, which ſeems to anſwer the purpoſe of a ſmall proboſcis, and, being extremely pliable, is uſeful to the animal in taking hold of the ſhoots of vegetables, and delivering them into the mouth. The horn is ſituated on the noſe, and is ſlightly curved, ſharp pointed, and very ſtrong, and is ſometimes three feet long, and 18 inches round at the baſe. This horn the rhinoceros uſes both as an offenſive and defenſive weapon, by which it is completely armed againſt the attacks of the moſt ferocious animals, who cannot face it without danger of having their bowels torn out. The Roman epigrammatiſt, Martial, long ago remarked, that with this horn the rhinoceros could lift up a bull as eaſily as a foot-ball. The ears are pretty large, upright and pointed; the eyes ſmall. The ſkin is naked, very rough, and marked with numerous large callous granulations; it is deſtitute of hair, except a few ſtraggling coarſe briſtles on ſome parts of the head. The folds of the ſkin are very remarkable, and are diſpoſed in various parts of the body in a ſingular manner. There is one large plait about the neck, another paſſing through the ſhoulders to the fore legs, and a third from the hind part of the back to the thighs. The belly is pendulous like that of a hog; the legs are very ſhort, ſtrong and thick; and the feet marked with three large hoofs all ſtanding forwards. The tail is ſlender, flattened at the end, and covered on the ſides with very ſtiff, thick, black hairs (c).

This animal is a native both of the continent of Aſia, and of ſeveral of the iſlands in the Indian ocean, eſpecially Ceylon, Java, and Sumatra; and is ſometimes found in Ethiopia. It uſually reſides in cool ſe-

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(c) For an accurate osteological account of this ſpecies with a figure of his ſkeleton by Cuvier, see *Annales du Muſeum National*, N° [illegible] or Philoſophical Magazine, [illegible]

Hiſtory of the Species. queſtered ſpots near waters and in ſhady woods, and delights to roll itſelf in the mud. It ſeems to live entirely on vegetables.

The ſight of this animal is but indifferent; but he is ſaid to poſſeſs an acute and moſt attentive ear, and to liſten with a deep, long-continued attention to any kind of noiſe. It is generally of a quiet inoffenſive diſpoſition, but when provoked or attacked, he becomes furious and implacable. He is even ſaid to be ſubject to paroxyſms of rage which nothing can allay. One that was ſent as a preſent to the pope by Emmanuel king of Portugal in 1513, deſtroyed the veſſel in which they were tranſporting it. He runs with great ſwiftneſs, and from his prodigious ſtrength ruſhes with reſiſtleſs violence through woods, and over every obſtacle, bending the ſmall trees as he paſſes like ſo many twigs.

The female produces but one young at a birth, but its time of geſtation is not certainly known.

The fleſh of this animal is eaten by the natives, who often engage in hunting parties againſt it. It is a difficult matter to kill the rhinoceros, its ſkin being ſo hard that an ordinary leaden bullet will not pierce it, and they are obliged to uſe iron bullets for that purpoſe. The horn is employed for many uſeful purpoſes, eſpecially for making drinking cups, which are uſed by the Indian princes, under an idea that if any poiſonous liquor is poured into them, it will ferment and boil over the top. Profeſſor Thunberg tried ſeveral of theſe horns, both of old and young animals, wrought into goblets and unwrought, with ſeveral poiſonous liquors, both weak and ſtrong, without obſerving any efferveſcence; but on pouring a ſolution of corroſive ſublimate into one of them, there aroſe a few bubbles, which he ſuppoſes to have been incloſed in the pores of the horn, and diſengaged from them by the liquor. The ſkin is alſo employed by the Javaneſe for making ſhields, and in ſome parts of India almoſt every part of the animal is uſed medicinally.

Several of theſe animals have been brought into Europe. Buffon gives an account of one, and Dr Parſons has given a particular deſcription of one that was brought to England from Bengal. This animal was only two years old, and yet conſumed ſo much food, that his voyage coſt 1000l. He had every day at three meals ſeven pounds of rice mixed with three pounds of ſugar, beſides hay and green plants, and he drank large quantities of water. He was in general, very quiet and peaceable, readily ſuffering people to touch every part of his body; but when hungry, or when ſtruck, he became very miſchievous, and nothing would appeaſe him but food. At this time he was about the ſize of a young cow.

In the year 1748, there was exhibited at Paris a rhinoceros brought from the kingdom of Ava. It was very tame, gentle, and even careſſing; was fed principally on hay and corn; and was much delighted with ſharp or prickly plants, and the thorny branches of trees. The attendants frequently gave him branches that had very ſharp and ſtrong thorns on them; but he bent and broke them in his mouth without ſeeming in the leaſt incommoded. It is true they ſometimes drew blood from the mouth and tongue, but that, ſays Father Le Comte, who gives us the deſcription, might even render them more palatable, and thoſe little wounds might ſerve only to cauſe a ſenſation ſimilar to that excited by ſalt, pepper, or muſtard on ours.

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The rhinoceros is even ſometimes domeſticated, and brought into the field of battle by the Aſiatics, in order to terrify their enemies; but he is ſo unmanageable, that his uſe ſeems to be attended with more diſadvantage than benefit, and when wounded, they are as likely to turn on their maſters as on the enemy.

49 Bicornis. Two-horned Rhinoceros.

R. Bicornis, Two-horned rhinoceros. In ſize, and in many of its general habits, this ſpecies greatly reſembles the former, but differs much in its external appearance, as the ſkin, inſtead of the regularly marked folds in that, has only a ſlight wrinkle acroſs the ſhoulders, and on the hind parts, ſo as, in compariſon with the other ſpecies, to appear almoſt ſmooth, though its ſurface is rough and tuberculated, eſpecially in the larger ſpecimens. It is chiefly diſtinguiſhed, however, by the two horns, one ſmaller than the other, and ſituated higher up on the front. Theſe horns are ſaid to be looſe when the animal is quiet, but to become fixed and immoveable when he is in an enraged ſtate. Dr Sparrman has obſerved that theſe horns are fixed to the noſe by a ſtrong apparatus of muſcles or tendons, ſo as to enable the animal to fix or relax them at pleaſure, and on inſpecting the horns and ſkin on which they are ſeated, it does not appear that the horns are firmly attached to the ſkull bone, or cloſely connected with it.

This ſpecies is found in various parts of Africa, and appears to have been that which was introduced by the Romans into their public ſhows.

Mr Bruce has given us an account of this animal, which is highly intereſting. He ſays that beſides the trees capable of moſt reſiſtance, there are in the vaſt foreſts within the rains, trees of a ſofter conſiſtence, and of a very ſucculent quality, which ſeem to be deſtined for his principal food. For the purpoſe of gaining the higheſt branches of theſe, his upper lip is capable of being lengthened out ſo as to increaſe his power of laying hold with it, in the ſame manner as the elephant does with his trunk. With this lip, and the aſſiſtance of his tongue, he pulls down the upper branches, which have moſt leaves, and theſe he devours firſt; having ſtripped the tree of its branches, he does not therefore abandon it, but placing his ſnout as low in the trunk as he finds his horns will enter, he rips up the body of the tree, and reduces it to thin pieces like ſo many laths; and when he has thus prepared it, he embraces as much of it as he can in his monſtrous jaws, and twiſts it round with as much eaſe as an ox would do a root of celery, or any ſuch pot herb or garden ſtuff.

When purſued, and in fear, he poſſeſſes an aſtoniſhing degree of ſwiftneſs, conſidering his ſize, the apparent unwieldineſs of his body, his great weight before, and the ſhortneſs of his legs. He is long, and has a kind of trot, which after a few minutes increaſes in a great proportion, and takes in a great diſtance; but this is to be underſtood with a degree of moderation. It is not true, that in a plain he beats the horſe in ſwiftneſs. Mr Bruce has paſſed him with eaſe, and ſeen many worſe mounted do the ſame; and though it is certainly true that a horſe can ſeldom come up with him, this is owing to his cunning, and not to his ſwiftneſs. He makes conſtantly from wood to wood, and forces himſelf into

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the thickeſt parts of them. The trees that are dead or dry, are broken down, as with a cannon ſhot, and fall behind him and on his ſide in all directions. Others that are more pliable, greener, or fuller of ſap, are bent back by his weight and the velocity of his motions: and after he has paſſed, reſtoring themſelves like a green branch to their natural poſition, they often ſweep the incautious purſuer and his horſe from the ground, and daſh them in pieces againſt the ſurrounding trees.

The eyes of the rhinoceros are very ſmall; he ſeldom turns his head, and therefore ſees nothing but what is before him. To this he owes his death, and never eſcapes if there be ſo much plain as to enable the horſe to get before him. His pride and fury then make him lay aſide all thoughts of eſcaping but by victory over his enemy. He ſtands for a moment at bay; then at a ſtart runs forward at the horſe like a wild boar, which in his manner of action he very much reſembles. The horſe eaſily avoids him by turning to one ſide, and this is the fatal inſtant; the naked man with the ſword drops from behind the principal horſeman, and unſeen by the rhinoceros, who is ſeeking his enemy the horſe, he gives him a ſtroke acroſs the tendon of the heel, which renders him incapable of further flight or reſiſtance.

In ſpeaking of the great quantity of food neceſſary to ſupport this enormous maſs, we muſt likewiſe conſider the vaſt quantity of water which he needs. No country but that of the Shangalla, which he poſſeſſes, deluged with ſix months rain, and full of large deep baſons made in the living rock, and ſhaded by dark woods from evaporation, or watered by large and deep rivers, which never fall low or to a ſtate of dryneſs, can ſupply the vaſt draughts of this monſtrous creature: but it is not for drinking alone that he frequents wet and marſhy places; large, fierce, and ſtrong as he is, he muſt ſubmit to prepare himſelf againſt the weakeſt of all his adverſaries. The great conſumption he makes of food and water neceſſarily confine him to certain limited ſpaces; for it is not every place that can maintain him; he cannot emigrate or ſeek his defence among the ſands of Atbara.

This adverſary is a fly (probably of the genus Oestrus) which is bred in the black earth of the marſhes: it perſecutes him ſo unremittingly, that it would in a ſhort time entirely ſubdue him, but for a ſtratagem which he practiſes for his preſervation. In the night when the fly is at reſt, the rhinoceros chuſes a convenient place, and there rolling in the mud, clothes himſelf with a kind of caſe, which defends him againſt his enemy for the following day. The wrinkles and folds of his ſkin ſerve to keep this muddy plaiſter firm upon him, except about his hips, legs, and ſhoulders, where by motion it cracks and falls off, leaving him expoſed to the attacks of the fly. The itching and pain which follow, occaſion him to rub himſelf in thoſe parts againſt the rougheſt trees, and this is ſuppoſed to be one cauſe of the numerous puſtules or tubercles which we ſee upon him.

He ſeems to enjoy the rubbing of himſelf very much, and groans and grunts ſo loud during this action that he is heard at a conſiderable diſtance. The pleaſure he receives from this enjoyment, added to the darkneſs of the night, deprives him of his uſual vigilance and attention. The hunters guided by his noiſe, ſteal ſecretly on him; and while lying on the ground, wound him with their javelins, moſtly in the belly, where the wound is mortal.

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It is by no means true that the ſkin of this rhinoceros, as it has been often repreſented, is hard and impenetrable like a board. In his wild ſtate he is eaſily killed by javelins thrown from different hands, ſome of which enter many feet into his body. A muſket ſhot will go through him, if it meet not with the intervention of a bone; and the Shangalla, an Abyſſinian tribe, kill him by the worſt and moſt inartificial arrows that ever were uſed by any people practiſing that weapon, and cut him to pieces afterwards with the very worſt of knives.

To ſhew the amazing ſtrength of the rhinoceros, even after being ſeverely wounded, we ſhall quote Mr Bruce's account of the hunting of this animal in Abyſſinia. "We were on horſeback (ſays this gentleman) by the dawn of day in ſearch of the rhinoceros, many of which we had heard making a very deep groan and cry as the morning approached. Several of the agageers (hunters) then joined us, and after we had ſearched about an hour in the very thickeſt part of the wood, one of them ruſhed out with great violence, croſſing the plain towards a wood of canes that was about two miles diſtance. But though he ran, or rather trotted, with ſurpriſing ſpeed conſidering his bulk, he was in a very little time transfixed with 30 or 40 javelins, which ſo confounded him that he left his purpoſe of going to the wood, and ran into a deep hole or ravine, a *cul de ſac*, without outlet, breaking above a dozen javelins as he entered. Here we thought he was caught as in a trap, for he had ſcarce room to turn, when a ſervant who had a gun ſtanding directly over him, fired at his head, and the animal fell immediately to all appearance dead. All thoſe on foot now jumped in with their knives to cut him up; and they had ſcarce begun, when the animal recovered ſo far as to riſe upon his knees: happy then was the man that eſcaped firſt; and had not one of the agageers who was himſelf engaged in the ravine, cut the ſinews of the hind leg as he was retreating, there would have been a very ſorrowful account of the foot hunters that day.

"After having diſpatched him, I was curious to ſee what wound the ſhot had given which had operated ſo violently upon ſo huge an animal, and I doubted not it was in the brain; but it had ſtruck him no where but upon one of the horns, of which it had carried off above an inch, and this occaſioned a concuſſion, that had ſtunned him for a minute till the bleeding had recovered him."

It has been often aſſerted that the tongue of the rhinoceros is ſo hard and rough as to take away the ſkin and fleſh wherever it licks any perſon that has unfortunately fallen a victim to its fury. Dr Sparrman ſays, however, that he thruſt his hand into the mouth of one that had juſt been ſhot, and found the tongue perfectly ſmooth and ſoft.

Foſſil bones have been found below the earth in Siberia that ſeem to belong to a third ſpecies of rhinoceros, differing from the two above mentioned in having a longer head, and in the partition between the noſtrils being otherwiſe ſhaped. It ſeems alſo to have had two horns. In 1772 a ſpecimen was dug up [illegible] entire, with the fleſh and ſkin not yet quite corrupted.

50 Elephas.

Genus 10. Elephas.

No cutting teeth in either jaw, very long tuſks in the upper jaw; noſe ending in a very long prehenſile proboſcis; body nearly naked.

51 Maximus. Elephant. Fig. 17.

We know of only one ſpecies, which has been called *elephas maximus*. Of all the animals that have engaged the attention of mankind from the earlieſt times, none has been ſo much, or perhaps ſo deſervedly celebrated as the elephant. Poſſeſſed of magnitude and ſtrength ſuperior to all other quadrupeds, he is more gentle and tractable than almoſt any of them, and in ſagacity and obedience to the commands of man, he is not excelled by any, except perhaps the dog.

The uſual height of the elephant is nine or ten feet, though he is ſaid to be ſometimes found at leaſt twelve feet high (D). His body is of a very clumſy and awkward form: his head very large; his back very much arched, and his legs very ſhort, and extremely thick. His eyes are very ſmall; but his ears large, pendulous, and irregularly waved about the edges. His trunk may be conſidered as one of the moſt wonderful inſtruments with which nature has gifted her moſt favoured animals, being little inferior in flexibility and utility, even to the hand of man. This organ appears to be compoſed of a great number of flexible rings, forming a double tube, ending in a circular tip that is ſomewhat flattened, and furniſhed with a projecting point, or fleſhy moveable hook, of exquiſite ſenſibility, and ſo pliable, that by means of it the animal can pick up from the ground almoſt the ſmalleſt object. Its lower ſurface is ſomewhat flattened, and it is circularly formed on the upper. The trunk is the principal organ of breathing to the elephant, being terminated by two orifices that are the noſtrils. By means of this tube he ſupplies himſelf with food, taking hold of it with the trunk, and conveying it into his mouth. He drinks by ſucking up the water into his trunk, and then pouring it into his mouth. The ſkull of the elephant is extremely thick, but not ſolid, there being a number of cavernous cells between the outer and inner laminæ. The feet of this animal are edged with five rounded hoofs; the tail is of a moderate length, and is terminated by a few ſcattered hairs, very thick, and of a black colour. The general colour of the ſkin is a duſky or blackiſh brown, but in ſome parts of India they are found of a white colour, though this is a rare occurrence.

The teeth of the elephant deſerve particular notice, as, till lately, our information reſpecting them was very imperfect. It has long been known that the females either ſeldom have tuſks, or that in them theſe are very ſhort. The tuſks of the male are ſometimes of an immenſe length, thoſe brought from the Moſambique and Cochin China having been ſeen 10 feet long. Mr Corſe has given us the beſt account of the elephant's teeth; and we ſhall extract ſome of the moſt intereſting particulars from his paper, which appeared in the Philoſophical Tranſactions for 1799.

The tuſks in ſome female elephants are ſo ſmall as not to appear beyond the lip, whilſt in others they are almoſt as large and long as in one variety of the male, called mooknah. The grinders are ſo much alike in both ſexes, that one deſcription may ſerve for both. The largeſt tuſks, and from which the beſt ivory is ſupplied, are taken from that kind of male elephant, called dauntelah from this circumſtance, in oppoſition to the mooknah, whoſe tuſks are not larger than thoſe of ſome females. In one variety of the elephant the tuſks point downwards, projecting only a little way beyond the trunk. The tuſks in elephants are fixed very deep in the upper jaw; and the root or upper part, which is hollow, and filled with a core, goes as high as the inſertion of the trunk, round the margin of the naſal opening to the throat; which opening is juſt below the protuberance of the forehead. Through this opening the elephant breathes, and by its means he ſucks up water into his trunk: between it and the roots of the tuſks there is only a thin bony plate. The firſt or milk-tuſks of an elephant never grow to any conſiderable ſize, but are ſhed between the firſt and ſecond year, when not two inches in length. The time at which the tuſks cut the gum varies conſiderably: ſometimes a young elephant has his tuſks at five months old, and ſometimes not till ſeven. Even in a fœtus which has arrived at its full time, theſe deciduous tuſks are formed. A young elephant ſhed one of his milk-tuſks on the 6th of November, 1790, when about 13 months old, and the other on the 7th of December, when above fourteen months old. Two months afterwards the permanent ones cut the gums, and on the 19th of April, 1791, they were an inch long. Another young elephant did not ſhed his milk-tuſks till he was 16 months old, which proves that the time of this proceſs varies conſiderably. The permanent tuſks of the female are very ſmall compared with thoſe of the male, and do not take their riſe ſo deep in the jaw. The largeſt elephant tuſks Mr Scot ever ſaw in Bengal did not exceed the weight of 72 pounds avoirdupois; and at Tiperah they ſeldom exceed 50 pounds each. Both theſe weights are very inferior to that of the tuſks brought from other parts to the India houſe, where ſome have weighed 150 pounds each. Theſe, Mr Scot ſuſpects, were from Pegu. The African elephant is ſaid to be ſmaller than the Aſiatic; yet the ivory dealers in London affirm that the largeſt tuſks come from Africa, and are of a better texture, and leſs liable to turn yellow, than the Indian ones. The increaſe of the tuſks ariſes from circular layers of ivory, applied internally, from the core on which they are formed, ſimilar to what happens in the horns of ſome animals.

The grinders of elephants may be conſidered as compoſed of ſeveral diſtinct laminæ or teeth, each covered

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(D) There is little doubt that the accounts generally given of the great height of the elephant have been much exaggerated. To John Corſe Scot, Eſq. F. R. S. naturaliſts are greatly indebted for clearing up many circumſtances relating to this animal. That gentleman declares that he never ſaw an elephant above ten feet high, and that the higheſt of which he could procure any authentic account did not exceed ten feet ſix inches.

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vered with its proper enamel; and theſe teeth are merely joined to each other by an intermediate ſofter ſubſtance, acting as a cement. This ſtructure, even at the firſt glance, muſt appear very curious, being compoſed of a number of perpendicular laminæ, which may be conſidered as ſo many teeth, each covered with a ſtrong enamel, and joined to one another by the common oſſeous matter: this, being much ſofter than the enamel, wears away faſter by the maſtication of the food; and in a few months after theſe teeth cut the gum, the enamel riſes conſiderably higher, ſo that the ſurface of each grinder ſoon acquires a ribbed appearance, as if originally formed of ridges. The number of theſe teeth or portions, of which an elephant's grinder is compoſed, varies from four to 23, according as the animal advances in age; ſo that a grinder or caſe of teeth in a full grown elephant is more than ſufficient to fill one ſide of the mouth. The ſhape of the grinders of the lower jaw differs from thoſe of the upper, which are very convex on the back part; whereas the lower has a bent or curved direction, adapting itſelf to the ſhape of the jaw, and is concave on the ſurface. The grinders, like the tuſks, are already formed, even in the very young animal. The firſt ſet of grinders, or milk teeth, begin to cut the gum eight or ten days after birth; they are not ſhed or caſt, as the milk-tuſks are, but are gradually worn away during the time the ſecond ſet are coming forward. Mr Scot could not aſcertain the exact time at which the ſecond ſet of grinders make their appearance; but when the elephant is two years old, the ſecond ſet are then completely in uſe. At about this period the third ſet begins to cut the gum; and from the end of the ſecond to the beginning of the ſixth year, the third ſet comes gradually forward as the jaw lengthens, not only to fill up this additional ſpace, but alſo to ſupply the place of the ſecond ſet, which are, during the ſame period, gradually worn away, and their fangs or roots abſorbed. From the beginning of the ſixth to the end of the ninth year, the fourth ſet of grinders comes forward, to ſupply the gradual waſte of the third ſet. After this period other ſets are produced, but in what time, and in what proportion, is not yet aſcertained; but it is reaſonable to conclude, that every ſucceeding grinder takes a year longer than its predeceſſor to be completed; and conſequently, that the fifth, ſixth, ſeventh, and eighth ſet of grinders will take from five to eight years (and probably much longer) each ſet, before the poſterior lamina has cut the gum.

The time of geſtation of the female elephant has been much diſputed. Ariſtotle ſtated it at two years, and Buffon was at one time led to fix the ſame period. Afterwards, however, this naturaliſt was induced to conſider nine months as the moſt likely time, and in this he was followed by Mr Pennant. We are indebted to Mr Scot for ſetting us right in this particular alſo; that gentleman having aſcertained by actual experiment, that the female goes with young nearly twenty-one months.

It is now fully proved that the elephant will readily breed in captivity, and that neither male nor female ſhew thoſe ſigns of modeſty and ſhyneſs which have been attributed to them. Mr Scot has repeatedly witneſſed the ceremony.

M. Buffon was led to conceive that elephants could not copulate in the ſituation that is cuſtomary to other quadrupeds, but this Mr Scot has alſo found to be an error. The young when firſt born is about three feet high, and continues growing for 16 or 18 years. The female has two teats a little behind the fore legs. It was ſuppoſed by Buffon, that the young elephant ſucked by means of its trunk, but later obſervations have ſhewn, that they ſuck in the uſual way with their mouth, uſing the trunk for graſping the dug of the mother to preſs out the milk.

Hiſtory of the Species.

Mr Scot corrects another miſtake, reſpecting the fondneſs of the female for her young. It was ſuppoſed that this was moſt exemplary, and that ſhe would defend her young with her life; but Mr Scot relates an inſtance where females ſuffered their young to be gored to death by a male elephant, without attempting to protect or reſcue them.

It has not yet been aſcertained how long an elephant uſually lives in its native foreſts. In captivity they are ſaid to live above 100 years.

The elephant is found on the continent of Aſia, in ſeveral of the Aſiatic iſlands, eſpecially Ceylon, and in the ſouthern part of Africa. The Ceyloneſe elephants are, in general, larger than thoſe of Africa. Captain Beaver informs us, that the little iſland of Bulama (on the weſtern coaſt of Africa) abounds with them. He ſays "the number of theſe animals on this little iſland almoſt exceeds belief; it was nearly impoſſible for us to proceed fifty yards inland without meeting recent and palpable veſtiges of them, and the ſkeletons of old ones that had died in the woods are frequently found." They often paſs over the arm of the ſea from the continent to this iſland, but what is very extraordinary, they have never been obſerved to return to the continent *.

The ordinary food of the elephant conſiſts of herbs, roots, leaves, and the tender branches of trees, which he breaks off with his trunk. As he is not a ruminating animal, he has only one ſtomach; but the extent of his bowels is very conſiderable, the colon alone being 15 or 20 feet long, and two or three in diameter. When an elephant diſcovers a plentiful paſture, he calls his neighbours together, to partake with him of the feaſt. They feed together in conſiderable herds, and as they require a large quantity of fodder, frequently ſhift their ſituation. They uſually march in troops, the oldeſt keeping foremoſt, and the middle aged bringing up the rear. The females are placed in the centre, carrying their young firmly held in their trunks. This order they obſerve when they forage near the haunts of men; but when at liberty to range in extenſive deſert plains, they are leſs guarded. They often make great havock in the cultivated fields, deſtroying even more with the weight of their enormous feet than they conſume as food. They are fond of cool ſequeſtered places, where they may be ſheltered from the mid-day ſun, and love to bathe themſelves with water, which they do by pouring it over their bodies with their trunks. They are ſaid frequently to roll themſelves in mud, probably like the rhinoceros, for the purpoſe of ſheathing their ſkin from the attacks of inſects. The elephant uſes many other artifices to rid himſelf of theſe winged enemies; he ſtrikes them with his tail, his ears, or his trunk; he contracts his ſkin, and cruſhes them between its wrinkles; he gathers boughs from the trees with his trunk, and bruſhes them away; and when all theſe

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* *Beaver's African Memoranda*, p. 353.

theſe arts are unſucceſsful, he collects duſt with his trunk, and ſtrews it over the moſt ſenſible parts of his body. He has been ſeen to duſt himſelf in this manner ſeveral times a-day, eſpecially after bathing. He ſwims with great eaſe, and in this way whole troops of them ſometimes paſs over rivers and narrow ſtraights. The largeſt tuſk elephants lead the way, and paſs firſt. When they arrive at the oppoſite ſhore, they try whether the landing place is good, and if ſo, they make a ſignal with their trunk, and ſome more of the old elephants ſwim over, the young following with their trunks locked together, and the reſt of the old ones bring up the rear.

This is nearly all we know of the manners of the elephant in the wild ſtate. Still more intereſting obſervations remain to be noticed reſpecting this animal when domeſticated. We ſhall firſt give an account of the manner in which elephants are taken; and this differs according as the object is to capture ſingle elephants, or a whole troop. Of the mode of taking elephants in Ceylon, Captain Percival has given us an intereſting deſcription in his account of Ceylon, to which we refer the reader.

The following is the method uſually employed at Tiperah in the Eaſt Indies, for ſecuring a ſingle male elephant. As the hunters know the places whither the elephants come to feed, they advance towards them in the evening, bringing with them four *koomkees*, or female elephants trained for the purpoſe. In the dark nights it is eaſy to diſcover the male elephants by the noiſe they make in cleaning their food, by whiſking it againſt their fore legs, and by moon light they may be diſtinctly ſeen at ſome diſtance. Having determined on the animal they wiſh to ſecure, they ſilently and ſlowly conduct three of the koomkees at a little diſtance from each other, near the place where the male is feeding. The females advance very cautiouſly, feeding as they approach, and appear like wild elephants that have ſtrayed from the foreſt. When the male perceives them, he ſometimes take the alarm, and if viciouſly inclined, he makes a noiſe, and beats the ground with his trunk, ſhewing evident marks of diſpleaſure, and of his unwillingneſs for them to come near him. If they perſiſt, he will immediately attack and gore them with his tuſks; they therefore take care to retreat in time. He generally, however, allows them to approach, and ſometimes even advances to meet them.

When the drivers find him thus gentle, they conduct two of the females cloſe to him, one on each ſide, and make them preſs gently againſt his neck and ſhoulders; the third then comes up, and is placed directly acroſs his tail. In this ſituation he is ſo far from ſuſpecting any deſign againſt his liberty, that he begins to toy with the females, and careſſes them with his trunk. The fourth female is now brought near, and proper aſſiſtants furniſhed with ropes get under his belly at the tail, and faſten a ſlight cord round his hind legs. If he takes no notice of this, they proceed to tie his legs with a ſtronger cord, paſſed alternately from one leg to the other, ſo as to form a figure of 8. Six or eight ſuch cords are uſually employed, one above another, and faſtened at their interſections, by another cord made to paſs perpendicularly up and down. A ſtrong cable about 60 cubits long, with a running nooſe, is next put round each hind leg, above the other cords, and over theſe ſix or eight more cords are croſſed as before from one leg to the other, all which takes up about 20 minutes, a ſtrict ſilence being obſerved all the time.

When thus properly ſecured, he is left to himſelf, the koomkees retiring to a little diſtance; in attempting to follow them, he finds his legs tied, and becoming ſenſible of the danger of his ſituation, immediately retreats towards the jungle. The drivers on the tame elephants, accompanied by a number of people who till this time had been kept out of ſight, follow him at a little diſtance, and as ſoon as he paſſes near a tree ſufficiently ſtout to hold him, they make a few turns of the long cables which trailed behind him round its trunk. His progreſs being thus ſtopped, he becomes furious, and exerts his utmoſt efforts to diſengage himſelf. The koomkees dare not now come near him, and in his fury he falls down on the earth and tears it up with his tuſks. In theſe exertions he ſometimes breaks the cables, and eſcapes into the thick jungle: here the drivers dare not advance for fear of the other wild elephants, and are therefore obliged to leave him to his fate; and in this hampered ſituation, it is ſaid, he is even ungenerouſly attacked by his former companions. But as the cables are ſtrong, and very ſeldom give way, when he has exhauſted himſelf by his exertions, the koomkees are again brought near him, and take their former poſitions, one on each ſide, and the other behind. After getting him nearer the tree, the people carry the ends of the long cables two or three times round it, ſo as to prevent even the poſſibility of his eſcape. His fore legs are now tied exactly in the ſame manner as his hind legs were, and the cables are made faſt, one on each ſide, to trees or ſtakes driven deep into the earth.

When he has become more ſettled, and will eat a little food, with which he is ſupplied as ſoon as he is taken, the koomkees are again brought near, and a ſtrong rope is put twice round his body, cloſe to his fore legs, like a girth, and tied behind his ſhoulder; then the long end is carried back cloſe to his rump, and there faſtened, after a couple of turns more have been made round his body. Another cord is next faſtened to this, and from thence carried under his tail like a crupper, and brought forward and faſtened to each of the girths. A ſtrong rope is now put round his buttocks, and made faſt to each ſide of the crupper, ſo as to confine the motion of his thighs, and prevent his taking a full ſtep. A couple of large cables, with running nooſes, are put about his neck, there ſecured, and then tied to the ropes on each ſide. Thus completely hampered, the cables round his neck are made faſt to two koomkees, one on each ſide.

Every thing being now ready, all the ropes are taken from his legs, except the ſtrong one round his buttocks to confine the motion of his hind legs, which is ſtill left. The koomkees pull him forward, ſometimes, however, not without much ſtruggling and violence on his part. When brought to his proper ſtation, and made faſt, he is treated with a mixture of ſeverity and gentleneſs, and generally in a few months becomes tractable, and appears perfectly reconciled to his fate.

It has happened that an elephant which eſcaped from captivity, ſuffered itſelf to be taken again by the hunters. This is not the only fact, as we ſhall ſee hereafter, that contradicts the obſervation of Horace, that no beaſt once eſcaped from ſlavery, ſuffers himſelf again to be entrapped (F).

The elephant when tamed, is gentle, obedient, and tractable, patient of labour, and ſubmits to the moſt toilful drudgery. He is ſo attentive to the commands of his governor, that a word or look is ſufficient to ſtimulate him to the greateſt exertions. His attachment to his keeper is remarkable: he careſſes him with his trunk, and frequently will obey no other maſter. He knows his voice, and can diſtinguiſh between the tones of command, of approbation, and of anger. He receives his orders with attention, and executes them with eagerneſs, but without precipitation. All his motions are grave, majeſtic, regular and cautious, and ſeem to correſpond with the dignity of his appearance. He kneels down for the accommodation of thoſe who would mount upon his back, and even helps them to aſcend with his trunk. He ſuffers himſelf to be harneſſed, and ſeems proud of the finery of his trappings; he will eaſily perform the work of ſeveral horſes, being able to carry from 3000 to 4000 weight. His conductor or *cornac* is uſually mounted on the neck of the elephant, and uſes a rod of iron ſharp at the end and hooked, with which he urges the animal forward, by pricking his head, ears, or muzzle, though this is ſeldom neceſſary, a word being uſually ſufficient.

In India, Mr Scot tells us, elephants are divided into two caſts, viz. the koomareah and the merghee. The firſt conſiſts of the large or full-bodied kind; the ſecond of the more ſlender, with longer legs and thinner trunk in proportion; it is alſo a taller animal, but not ſo ſtrong as the former. A large trunk is always conſidered as a great beauty in an elephant, ſo that the koomareah is preferred not only on this account, but for his ſuperior ſtrength in carrying burthens, &c. Many indiſtinct varieties are again produced from the intermixture of theſe two breeds. The torrid zone ſeems to be the natural clime of the elephant, and the moſt favourable for the production of the largeſt and hardieſt race; and when this animal migrates beyond the tropics, the ſpecies degenerates.

The following marks are laid down by Mr Scot as deſcriptive of a perfect elephant. His ears ſhould be large and rounded, not ragged or indented at the margin: his eyes of a dark hazel colour, free from ſpecks: the roof of his mouth and his tongue without dark or blackiſh ſpots of any conſiderable ſize: his trunk large: his tail long, with a tuft of hair reaching nearly to the ground. There muſt be five nails on each of his fore feet, and four on each of his hind ones; his head well ſet on, and carried rather high; the arch or curve of his back riſing gradually from the ſhoulder to the middle, and thence deſcending to the inſertion of the tail; and all his joints firm and ſtrong.

The value of an elephant varies much, according to his caſt, and as he has more or leſs of the above marks. The uſual price at Ceylon is 50 guineas, but they ſometimes fetch conſiderably more.

Elephants are kept by the princes and grandees of India, chiefly for ſhew and magnificence. In their travels the Indian princes are attended by hundreds of theſe animals. Some are employed to carry the ladies which compoſe the ſeraglio, who are placed in latticed cages covered with branches of trees; while others tranſport the immenſe quantities of baggage which the ſovereigns of the eaſt uſually carry with them in their journeys. Great care is taken in the management and decoration of theſe elephants. They are daily fed, bathed, oiled, and rubbed, and frequently painted about the ears and head with various colours, and their tuſks ſurrounded with rings of gold and ſilver. When employed in proceſſions, they are covered with the moſt gaudy and ſumptuous trappings.

Elephants are now ſeldom employed in war, as in the preſent ſtate of warfare they can be of little advantage. The ancients, as is well known, uſed numbers of them in their armies, and we are told that Porus oppoſed the paſſage of Alexander over the Hydaſpes with 85 elephants. The accounts related of thoſe brought by Pyrrhus againſt the Romans, are familiar to moſt of our readers, and Buffon ſuppoſes that ſome of theſe were among the number that Alexander took and ſent into Greece. In the later periods of the Roman republic, elephants were frequently exhibited to the people, for the cruel purpoſe of being put to death in conflicts with armed men. It is ſaid that Pompey, in the ſpace of five days, deſtroyed 18 elephants in this way, with a view of entertaining the populace, among whom the cries of the elephants are ſaid to have excited much commiſeration.

In the eaſt, elephants are ſometimes employed as the executioners of public juſtice, and they will trample a criminal to death, break his limbs with their trunk, or impale him on their enormous tuſks, according to the orders given them. In ſome parts of India they were formerly employed in launching ſhips, which they effect by puſhing the veſſel with their heads. We are told that one of them being directed to force a large veſſel into the water, and this proving too much for his ſtrength, the maſter in an angry tone cried out, Take away that lazy beaſt, and bring another in his place. The poor animal repeated his efforts, fractured his ſkull, and died upon the ſpot.

A great many inſtances have been recorded of the ſagacity, and almoſt reaſoning power of this wonderful animal. We ſhall mention a few of theſe. "I was," ſays M. Philippe, an eye witneſs to the following facts: —At Goa, there are always ſome elephants employed in the building of ſhips. I one day went to the ſide of the river, near which a great ſhip was building, where there is a large area filled with beams for that purpoſe. Some men tie the ends of the heavieſt beams with a rope, which is handed to an elephant, who carries it to his mouth, and after twiſting it round his trunk,

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(F) ———Quæ bellua ruptis,
Cum ſemel effugit, reddit ſe prava catenis

[illegible]

trunk, draws it, without any conductor, to the place where the ſhip is building, though it may have been only once pointed out to him. One of theſe ſometimes drew beams ſo large, that more than 20 men would have been unable to move them. But what ſurpriſed me ſtill more, when other beams obſtructed the road, he elevated the ends of his own beams that they might run eaſily over thoſe which lay in his way. Could the moſt enlightened man do more?"

He well knows when he is mocked, or otherwiſe ill treated. The ſtory of the taylors of Delhi, who were drenched with puddle water by an elephant for having pricked his trunk with a needle, is well known. The following inſtance of retaliation is not leſs worthy of notice. An elephant driver at Macaſa having a cocoa nut given him, he, out of wantonneſs ſtruck it twice againſt his elephant's head, to break it. The next day when the animal was paſſing through the ſtreet, he ſaw ſome cocoa nuts expoſed to ſale, and taking up one of them with his trunk, he beat it about the driver's head till he completely killed the man. This comes, ſays the relater, of jeſting with an elephant.

When much provoked, he has been known to take the moſt dreadful vengeance. He is extremely fond of wine and ſpirits, and by ſhewing him a veſſel of arack, he is induced to uſe the greateſt efforts, and take the utmoſt pains in hopes of gaining it as the reward of his labour. An elephant diſappointed of his reward in this way, out of revenge killed his cornac or governor. The poor man's wife, who beheld the dreadful ſcene, took her two infants, and threw them at the feet of the enraged animal, ſaying, "ſince you have ſlain my huſband, take my life alſo, as well as that of my children." The elephant inſtantly ſtopped, relented, and as if ſtung with remorſe, took the eldeſt boy in his trunk, placed him on his neck, adopted him for his cornac, and would never allow any other perſon to mount it.

The elephant is ſometimes ſeized with periodical fits of rage, and during theſe he will deſtroy the firſt perſon he meets with; but what is very remarkable, when he has ſacrificed one victim, he becomes inſtantly appeaſed, and may be then led and governed as uſual.

The following inſtance of mutual affection between a male and female elephant, who had before been much together, and were brought to Paris in ſeparate conveyances, is very intereſting.

The place for their reception had been long prepared. It was a ſpacious hall in the muſeum of natural hiſtory, well aired and lighted. A ſtove was placed in it to warm it during the winter; and it was divided into two apartments, which had a communication with each other by means of a large door reſembling a portcullis. The incloſure round theſe apartments, conſiſted of rails made of ſtrong thick beams, and a ſecond incloſure, breaſt-high, ran round them, to keep the ſpectators at ſome diſtance, and preſerve them from accidents.

The morning after their arrival, theſe animals were put in poſſeſſion of their new habitation. The firſt conducted to it was the male, who iſſued from his cage with precaution, and ſeemed to enter his apartment with a degree of ſuſpicion. His firſt care was to reconnoitre the place. He examined each bar with his trunk, and tried their ſolidity by ſhaking them. Care had been taken to place on the outſide the large ſcrews by which they were held together. Theſe he ſought out, and, having found them, tried to turn them, but was not able. When he arrived at the portcullis which ſeparates the two apartments, he obſerved that it was fixed only by an iron bar, which roſe in a perpendicular direction. He raiſed it with his trunk, puſhed up the door, and entered into the ſecond apartment, where he received his breakfaſt. He ate it quietly, and appeared to be perfectly eaſy.

Bruta.

During this time people were endeavouring to make the female enter. We ſtill recollect the mutual attachment of theſe two animals, and with what difficulty they were parted and induced to travel ſeparately. From the time of their departure they had not ſeen each other, not even at Cambray, where they paſſed the winter. They had only been ſenſible that they were near neighbours. The male never lay down, but always ſtood upright or leaned againſt the bars of his cage, and kept watch for his female, who lay down and ſlept every night. On the leaſt noiſe, or the ſmalleſt alarm, he ſent forth a cry to give notice to his companion.

The joy which they expreſſed on ſeeing each other, after ſo long a ſeparation, may be readily imagined. When the female entered, ſhe ſent forth a cry expreſſive only of the pleaſure which ſhe felt at finding herſelf at liberty. She did not at firſt obſerve the male, who was buſy feeding in the ſecond apartment. The latter did not immediately diſcover that his companion was ſo near him; but the keeper having called him, he turned round, and immediately the two animals ruſhed towards each other, and ſent forth cries of joy, ſo animated and loud, that they ſhook the whole hall. They breathed alſo through their trunks with ſuch violence, that the blaſt reſembled an impetuous guſt of wind. The joy of the female was the moſt lively: She expreſſed it by quickly flapping her ears, which ſhe made to move with aſtoniſhing velocity, and drew her trunk over the body of the male with the utmoſt tenderneſs. She, in particular, applied it to his ear, where ſhe kept it a long time; and after having drawn it over the whole body of the male, would often move it affectionately towards her own mouth. The male did the ſame thing over the body of the female; but his joy was more concentrated: He ſeemed to expreſs it by his tears, which fell from his eyes in abundance.

Beſides the uſe made of the elephant, when living, he is ſometimes hunted for the ſake of his tuſks and fleſh. Mr Bruce has given us an intereſting account of the mode of hunting elephants in Abyſſinia, and with this we ſhall conclude our hiſtory of this animal.

The men who make the hunting of elephants their buſineſs, dwell conſtantly in the woods, and live entirely upon the fleſh of the animals they kill, which is chiefly that of the elephant or rhinoceros. They are exceedingly thin, light, and agile, both on horſeback and on foot. They are called *agageer*, a name derived from the word *agar*, which ſignifies to hamſtring with a ſharp weapon. More properly it means, indeed, the cutting of the tendon of the heel, and is a characteriſtic of the manner in which they kill the elephant, which is thus:—Two men, quite naked, to prevent their being laid hold of by the trees or buſhes in making their eſcape from this very watchful enemy, get on horſeback. One of theſe riders ſits on the back of the horſe, ſometimes with a ſaddle, and ſometimes without one, with only a ſhort ſtick in one hand, carefully managing the bridle with the other: behind him ſits his companion, armed only with a broad ſword. His left hand is employed in graſping the ſword by the handle; about 14 inches of the blade of which are covered with whip cord. This part he takes in his right hand, without any danger of being hurt by it; and though the edges of the lower part of the ſword are as ſharp as a razor, he carries it without a ſcabbard.

"As ſoon as an elephant is found feeding, the horſeman rides before him, as near his face as poſſible; or if he flies, croſſes him in all directions, calling out, 'I am ſuch a man and ſuch a man, this is my horſe, that has ſuch a name; I killed your father in ſuch a place, and I am now come to kill you; you are but an aſs in compariſon with them.' This nonſenſe he believes the elephant perfectly underſtands, who, chafed and angry at hearing the noiſe immediately before him, attempts to ſeize him with his trunk; and, intent upon this, follows the horſe everywhere, turning round and round with him, neglectful of making his eſcape by running ſtraight forward, in which conſiſts his only ſafety. After having made him turn a few times in purſuit of the horſe, the horſeman rides up alongſide of him, and drops his companion juſt behind on the off-ſide; and while he engages the elephant's attention upon the horſe, the footman behind gives him a drawn ſtroke juſt above the heel, into what in man is called the *tendon of Achilles*. This is the critical moment; the horſeman immediately wheels round, again takes his companion up behind him, and rides off after the reſt of the herd, if they have ſtarted more than one; and ſometimes an expert agageer will kill three out of one herd. If the ſword is good, and the man not afraid, the tendon is commonly entirely ſeparated; and if it is not cut through, is generally ſo far divided, that the animal, with the ſtreſs he puts upon it, breaks the remaining part aſunder. In either caſe, he remains incapable of advancing a ſtep, till the horſeman returning, or his companions coming up, pierce him through with javelins and lances; he then falls to the ground, and expires from loſs of blood.

"The elephant once ſlain, they cut the whole fleſh off his bones into thongs, like the reins of a bridle, and hang theſe, like feſtoons, upon the branches of trees, till they become perfectly dry, without ſalt, and they then lay them by for their proviſion in the ſeaſon of the rains" *.

Boſman and Labat give us terrible ideas of the courage of the elephant, and his fury when wounded; but either their accounts are much exaggerated, or the modern elephant is a much more timid animal than that of their time. Captain Beaver aſſures us, that when an elephant is attacked, it will endeavour to eſcape by any opening it can perceive; that whenever they fired at it on ſhore, it never turned on its enemies, but made for the openings that led into the woods. The Bijugas and Biaforas uſe a very long gun, loaded with a piece of an iron rod nearly equal to its caliber, for attacking the elephant, and always aim at the flank, or behind the ear, theſe being the moſt dangerous parts in which the animal can be wounded. The elephant is ſcarcely ever killed by a ſingle ſhot †.

History of the Species.

51
Mammoth.

For many years paſt a number of large bones and extraordinary teeth, have been diſcovered in the northern parts both of Aſia and America, which at firſt were generally attributed to the elephant, though in Siberia they were conſidered as belonging to a monſtrous animal called *mammoth*, whoſe fabulous exiſtence they ſuppoſed to be under ground. In North America theſe large bones and carnivorous grinders have been found in great abundance on the Ohio and its tributary ſtreams, waſhed from their banks, or diſcovered by digging in ſalt moraſſes in the neighbourhood of Cincinati, where they are found intermixed with the bones of buffaloes and deer, which a tradition of the Indians ſtates to have been deſtroyed by a herd of theſe animals which came upon them from the north. This event happened, the Indians believe, as a puniſhment for their ſins; but they ſay that the good ſpirit at length interpoſed to ſave them, and ſeating himſelf on a neighbouring rock, where they ſhew you the print of his ſeat and of one foot, hurled his thunderbolts againſt them. All were killed except one male, who, preſenting his forehead to the ſhafts, ſhook them off, until at length wounded, he ſprang over the Wabaſh, the Illinois, and the Great Lake, where he ſtill lives.

Theſe bones were forwarded with eagerneſs to all parts of Europe, and depoſited in muſeums, where they attracted the curioſity of all naturaliſts, whoſe conjectures and theories on them were very various, until Dr Hunter, by a more accurate compariſon between them and the bones of other animals, determined that they muſt have belonged to a large non-deſcript animal of the carnivorous kind, ſomewhat reſembling the hippopotamus and the elephant, yet eſſentially different from both.

The ſubject is now completely elucidated. Not long ſince ſome farmers in the ſtate of New York, in America, digging marl from their moraſſes in the neighbourhood of New Windſor, accidentally diſcovered ſeveral of theſe bones, which were preſerved by phyſicians in the neighbourhood. In the autumn of 1801, Mr Charles Peale, and his ſon Mr Rembrandt Peale, having obtained poſſeſſion of thoſe bones, perſevered for near three months, with much labour and expence, in ſearching for the remainder of this animal, and were at length ſo fortunate as to obtain two ſkeletons found in two diſtinct ſituations, and unmixed with the bones of any other individual. One of theſe is preſerved in the muſeum at Philadelphia, and the other was exhibited a few years ago in London, previouſly to its being taken to Paris.

The length of this ſkeleton, from the chin to the rump, was 15 feet, and its height over the ſhoulders 11 feet; and from the point of the tuſks to the end of the tail, in a ſtraight line, it was 17 feet long. The whole ſkeleton weighed about 1000lb.

The following differences between the ſkull of the mammoth, and that of the elephant, are given by Mr R. Peale.

On examining the head of the elephant, it will appear, that the ſockets for the tuſks are ſituated, with reſpect to the condyle of the neck, nearly in an angle of 45°, ſo that the tuſks, which have but little curve, are directed downwards and forwards, and may be with eaſe employed offenſively and defenſively. On the other hand it will be obſerved, that, in the mammoth, the ſocket is nearly in a horizontal line with the condyle;

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* *Bruce's Travels.*

† *Beaver's African Memoranda*, p. 350.

dyle; and therefore the tuſks, which are ſemicircular, could never have been elevated in the air, pointing backwards, but muſt have had their points thrown out by the ſpiral twiſt on each ſide.

In the elephant, the orbit of the eye is ſituated where, in the mammoth, there is a large maſs of bone. The cheek of the elephant is formed of two bones; but in the mammoth, beſides other variations, there is but one bone. The whole figure of the under jaw differs conſiderably, in the length of the condyles or arms, which in the mammoth is ſhort and angular, but in the elephant forms a ſemicircular line *.

Mr R. Peale ſeems to have no doubt that the mammoth was a carnivorous animal, feeding chiefly on ſhell fiſh; but if the animal, whoſe ſtomach was lately found in digging a well near a ſalt lake in Wythe county, Virginia, were really a mammoth, it is clear that this animal was at leaſt capable of living on herbage. The contents of this ſtomach, which were in a ſtate of perfect preſervation, conſiſted of half maſticated reeds, twigs, and graſs or leaves †.

Genus 11. SUKOTYRO.

53 Sukotyro. Fig. 18. Of this genus there is only one ſpecies, of which we know little or nothing, and are not even certain that it exiſts: the little information that has been given of it being confined to a ſingle traveller, Nieuhoff. He deſcribes it as a quadruped of a very ſingular ſhape, about the ſize of a large ox, with a ſnout like that of a hog, long and rough ears, and a thick and buſhy tail. He ſays that the eyes are placed upright in the head, and that on each ſide of the head, next to the eyes, ſtand two horns or rather tuſks, not quite ſo large as theſe of the elephant, that it feeds on herbage, and is a native of Java.

Genus 12. PLATYPUS.

54 Platypus. Fig. 19. Mouth ſhaped like the bill of a duck, with two grinders on each ſide in each jaw; feet webbed.

There is only one ſpecies, which has been called *P. Anatinus*, or Duck-billed Platypus. It was brought from New Holland, and preſented to Sir Joſeph Banks. An account of it was firſt publiſhed by Dr Shaw in the Naturaliſts Miſcellany, and afterwards in the General Zoology of the ſame author, from which the following account is taken.

"Of all the mammalia yet known, this ſeems the moſt extraordinary in its conformation, exhibiting the perfect reſemblance of the beak of a duck engrafted on the head of a quadruped. So accurate is the ſimilitude, that, at firſt view, it naturally excites the idea of ſome deceptive preparation by artificial means; the very epidermis, proportion, ſerratures, manner of opening, and other particulars of the beak of a ſhoveler, or other broad billed ſpecies of duck, preſenting themſelves to the view; nor is it without the moſt minute and rigid examination that we can perſuade ourſelves of its being the real beak or ſnout of a quadruped.

"The body is depreſſed, and has ſome reſemblance to that of an otter in miniature. It is covered with a very thick, ſoft, and beaver-like fur, and is of a moderately dark brown above, and of a ſubferruginous white beneath. The head is flattiſh, and rather ſmall than large. The mouth or ſnout, as before obſerved, ſo exactly reſembles that of ſome broad-billed ſpecies of duck, that it might be miſtaken for ſuch. Round the baſe is a flat circular membrane, ſomewhat deeper or wider below than above, viz. below, near the fifth of an inch, and above, about an eighth. The tail is flat, furry like the body, rather ſhort, and obtuſe, with an almoſt bifid termination; it is broader at the baſe, and gradually leſſens to the tip, and is about three inches in length; its colour is ſimilar to that of the body. The length of the whole animal, from the tip of the beak to that of the tail, is 13 inches; of the beak an inch and a half. The legs are very ſhort, terminating in a broad web, which on the fore feet extends to a conſiderable diſtance beyond the claws; but on the hind feet reaches no farther than the roots of the claws. On the fore feet are five claws, ſtraight, ſtrong, and ſharp-pointed; the two exterior ones ſomewhat ſhorter than the three middle ones. On the hind feet are ſix claws, longer and more inclining to a curved form than thoſe on the fore feet; the exterior toe and claw are conſiderably ſhorter than the four middle ones: the interior, or ſixth, is ſeated much higher up than the reſt, and reſembles a ſtrong ſharp ſpur. All the legs are hairy above: the fore feet are naked, both above and below. The internal edges of the under mandible (which is narrower than the upper) are ſerrated or channelled with numerous ſtriæ, as in a duck's bill. The noſtrils are ſmall and round, and are ſituated about a quarter of an inch from the tip of the bill, and are about one-eighth of an inch diſtant from each other. There is no appearance of teeth: the palate is removed; but it ſeems to have reſembled that of a duck: the tongue alſo is wanting in the ſpecimen here deſcribed. The ears or auditory orifices, are placed about an inch beyond the eyes; they appear like a pair of oval holes of the eighth of an inch in diameter, there being no external ear. On the upper part of the head, on each ſide, a little beyond the beak, are ſituated two ſmalliſh oval white ſpots, in the lower part of each of which are imbedded the eyes, or at leaſt the parts allotted to the animal for ſome kind of viſion; for, from the thickneſs of the fur, and the ſmallneſs of the organs, they ſeem to have been but obſcurely calculated for diſtinct viſion, and are probably like thoſe of moles, and ſome other animals of that tribe; or perhaps even ſubcutaneous, the whole apparent diameter of the cavity in which they are placed not exceeding the tenth of an inch.

"When we conſider the general form of this animal, and particularly its bill and webbed feet, we ſhall readily perceive, that it muſt be a reſident in watery ſituations; that it has the habits of digging or burrowing in the banks of rivers, or under ground, and that its food conſiſts of aquatic plants and animals. This is all that can at preſent be reaſonably gueſſed at; future obſervations, made in its native regions, will, it is hoped, afford us ample information, and will make us fully acquainted with the natural hiſtory of an animal which differs ſo widely from all other quadrupeds, and which verifies in a moſt ſtriking manner the obſervation of Buffon, viz. that whatever was poſſible for nature to produce, has actually been produced" *.

This animal was firſt called *Ornithorynchus Paradoxus*, and it has been deſcribed under this name by Blumenbach of Gottingen, and by Mr Home of London. See Phil. Tranſ. for 1800.

Mr

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* *Philoſoph.* Mag.

† Nichol. Journ. 8vo. vol. x. p. 359.

* *Shaw's Zoology*, vol. i.

Mr Home found on diſſection, that the beak of the platypus differs materially from the bill of a bird; that it was independent of the cavity of the mouth, which was ſimilar to that of other quadrupeds, having two grinders on each ſide in both jaws, but without fangs.

Genus 13. TRICHECUS. *Walrusses.*

No fore teeth in the full-grown animal in either jaw. Tuſks in the upper jaw ſolitary; grinders with wrinkled ſurfaces. Lips double. Hind feet uniting at the extremity of the body into a fin.

This genus conſtitutes one of the links that connect the quadrupeds with the fiſhes; the walruſſes and manati being marine animals, who, though they ſometimes come on ſhore, paſs moſt of their time in the water. They feed on ſea weeds and ſhell fiſh, and do not appear to be carnivorous. There are about ſeven ſpecies, which are diſtinguiſhed by the following names and characters.

1. *T. Roſmarus*, Morſe or Arctic Walrus. Tuſks diſtant and exſerted.—2. *T. Dugon*, Dugon or Indian W. Tuſks exſerted and approximate.—3. *T. Borealis*, Whale-tailed W. Hairleſs, with a horizontal tail in place of hind feet.—4. *T. Auſtralis*, Round-tailed W. Hairy, with a horizontal tail in place of feet.—5. *T. Manatis*, Guiana W. Slightly hairy, without tuſks, and with a horizontal tail in place of hind feet. The following are named, but not characterized, by Dr Shaw, viz. 6. *T. Amazonius*, and 7. *T. Hydropithecus*.

Rosmarus, Arctic Walrus. [illegible] fig. 2[illegible]

1. *T. Roſmarus*, Arctic Walrus.—This is a very large animal, growing ſometimes to the length of 18 feet, and ſo thick as to meaſure 12 feet about the middle of the body. Its form is clumſy and inelegant, having a ſmall head, ſhort neck, thick body, and ſhort legs. The lips are very thick, and the upper lip is indented or cleft into two large rounded lobes: over the whole ſurface of this part are ſcattered numerous ſemitranſparent briſtles, of a yellowiſh tinge, and of ſuch a thickneſs as almoſt to equal a ſtraw in diameter; they are about three inches long, and are ſlightly pointed at their extremities. The eyes are ſmall. Inſtead of external ears, there are only two ſmall round orifices. The ſkin, on the whole, is thick, and more or leſs wrinkled, and is ſcattered over with ſhort browniſh hair. On each foot are five toes, all connected by webs, and on each toe is a ſmall nail; the hind feet are conſiderably broader than the fore feet. The tail is extremely ſhort. In the upper jaw are two large and long tuſks bending downwards.

The arctic walrus inhabits the northern ſeas, and is chiefly found within the arctic circle. Great numbers are often met with in the Magdalen iſles in the gulf of St Lawrence. They are gregarious, and are ſometimes ſeen in vaſt multitudes on the maſſes of floating ice that are found in thoſe high latitudes. They are harmleſs, unleſs when attacked or provoked, in which caſe they become furious, and extremely vindictive. When ſurpriſed on the ice, the females firſt provide for the ſafety of their young, by flinging them into the ſea, and themſelves after them. Having carried theſe to a ſecure diſtance, they will return to the place again with great rage to revenge any injury they have received. They will ſometimes attempt to faſten their teeth on the boats, in order to ſink them, or riſe in great numbers under them with the intention of overſetting them, at the ſame time ſhewing all the marks of rage, by roaring in a dreadful manner, and gnaſhing their teeth with great violence. They are ſtrongly attached to each other, and will make every effort in their power, even to death, to ſet at liberty their harpooned companions. A wounded walrus has been known to ſink to the bottom, riſe ſuddenly again, and bring up with it multitudes of others, who have united in an attack on the boat from which the inſult came.

The following picture of a herd of walruſſes on a maſs of floating ice, is given by Captain Cook. "They lie in herds of many hundreds upon the ice, huddling over one another like ſwine, and roar or bray very loud, ſo that in the night, or in foggy weather, they gave us notice of the vicinity of the ice, before we could ſee it. We never found the whole herd aſleep, ſome being always upon the watch. Theſe, on the approach of the boat, would wake thoſe next to them; and the alarm being thus gradually communicated, the whole herd would be awake preſently. But they were ſeldom in a hurry to get away, till after they had been once fired at. They then would tumble over one another into the ſea in the utmoſt confuſion. And if we did not, at the firſt diſcharge, kill thoſe we fired at, we generally loſt them, though mortally wounded. They did not appear to us to be that dangerous animal which ſome authors have deſcribed, not even when attacked. They are rather more ſo in appearance than in reality. Vaſt numbers of them would follow and come cloſe up to the boats. But the flaſh of a muſket in the pan, or even the bare pointing of one at them, would ſend them down in an inſtant. The female will defend the young to the very laſt, and at the expence of her own life, whether in the water or upon the ice. Nor will the young one quit the dam, though ſhe be dead; ſo that if one is killed, the other is certain prey. The dam, when in the water, holds the young one between her fore fins."

The tuſks of this animal are uſed as ivory; but authors ſeem to differ with reſpect to its quality, ſome taking it as ſuperior, and others far inferior to that of the elephant. The walrus is taken chiefly for the ſake of its oil and its ſkin, from which latter is prepared a very ſtrong and elaſtic leather.

This order contains nine genera, and about 30 ſpecies.

CHAP. III. FERÆ.

Genus 14. PHOCA. *Seals.*

Phoca.

Six fore teeth in the upper jaw, pointed, parallel, outer the larger; four in the lower jaw, bluntiſh, parallel, equal and diſtinct. One canine tooth on each ſide in both jaws, large and pointed; the upper diſtinct from the cutting teeth; the lower from the grinders. Five grinders on each ſide in the upper, and ſix in the lower jaw; obtuſely tricuſpidated. Hind feet growing together.

This conſtitutes another tribe of marine animals; but theſe are much better fitted for living on land than the walruſſes, and indeed they paſs much of their time either on the ſea ſhores, on inſulated rocks, or on the ice in the frozen ſeas, aſſembling in theſe places in vaſt numbers, eſpecially at the time when the females bring forth their young. Here they lie baſking in the ſun or ſporting with each other, and here they take their repoſe. They are found in all ſeas, and ſome of them are ſaid to inhabit large inland lakes. They feed chiefly on fiſh and ſea weeds.

The ſpecies are numerous, at leaſt 19 being deſcribed by naturaliſts, viz.

1.* *P. Vitulina*, Common Seal. Earleſs, brown, with ſmooth head and neck.—2. *Bicolor*, Pied S. Earleſs, black, variegated with white, with elongated noſe and lunated hind feet.—3. *P. Monachus*, Mediterranean S. Earleſs, with four cutting teeth in each jaw, undivided fore feet, and the hinder pinniform and without claws.—4. *P. Longicollis*, Long-necked S. Earleſs, long-necked, with the fore feet pinniform.—5. *P. Falklandica*, Falkland-iſle S. Cinereous, with ſmall-pointed ears, and furrowed cutting teeth.—6. *P. Teſtudinea*, Tortoiſe-headed S. Tortoiſe-ſhaped head and ſlender neck.—7. *P. Faſciata*, Ribbon S. Blackiſh, with a ſquariſh dorſal yellow band.—8. *P. Leporina*, Leporine S. with white, ſoft, ſubereĉt fur.—9. * *P. Barbata*, Great S. Earleſs, blackiſh, with ſmooth head.—10. *P. Hiſpida*, Rough S. Pale brown, ſubauriculated, with ſmooth head, and the body covered with riſing briſtly hair.—11. *P. Porcina*, Porcine S. Eared, with hog like ſnout and five-toed feet.—12. *P. Flaveſcens*, Yellow S. Yellowiſh, with pointed ears.—13. *P. Criſtata*, Hooded S. Gray, with a folding ſkinny creſt on the forehead.—14. *P. Groenlandica*, Harp S. Earleſs, gray, with a black dorſal creſcent; the horns pointing downwards along the ſides.—15. *P. Puſilla*, Little S. Subauriculated, duſky, with ſmooth head —16. *P. Urſina*. Urſine S. Eared, blackiſh, with flattiſh noſe, and fin-like fore feet.—17. *P. Leonina*, Bottle-noſed S. Brown, male having a projecting creſt or inflated membrane on the ſnout.—18. *P. Jubata*, Leonine S. Reddiſh brown, male furniſhed with a large mane round the neck.—19. *P. Lupiora*, Urigne S. Earleſs, with dog-like head, and fin-like fore feet.

58
Vitulina.
Common Seal.
Fig. 21.

1. *P. Vitulina*, Common Seal, or Sea Calf.—The uſual length of this ſpecies is from five to ſix feet. It has a large round head, a ſmall ſhort neck, and ſeveral ſtrong briſtles on each ſide of its mouth; large eyes, no external ears, and a forked tongue. The body tapers from the ſhoulders to the tail. The legs are very ſhort, and the feet all webbed. The hind legs are placed ſo far back as to be of but little uſe, except in ſwimming. The tail is very ſhort. They vary in colour, being ſometimes gray, ſometimes brown or blackiſh, and now and then ſpotted with white and yellow. They inhabit all the European ſeas, and are found round all the coaſts of the northern hemiſphere. They are alſo ſeen in vaſt quantities about the ſouthern polar regions; and Mr Pennant informs us, that they even inhabit ſome freſh-water lakes, eſpecially that of Baikal. Their dens or habitations are formed in hollow rocks or caverns out of the reach of the tide.

They are excellent ſwimmers, and ready divers, and are very bold when in the ſea. In the ſummer they will come out of the water, to baſk or ſleep in the ſun, on the top of large ſtones, or ſhivers of rocks; and that is the opportunity our countrymen take of ſhooting them: if they chance to eſcape, they haſten towards their proper element, flinging ſtones and dirt behind them as they ſcramble along; at the ſame time expreſſing their fears by piteous moans; but if they happen to be overtaken, they will make a vigorous defence with their feet and teeth, till they are killed. They are taken for the ſake of their ſkins, and for the oil their fat yields; the former ſell for 4s. or 4s. 6d. a piece, and, when dreſſed, are very uſeful in covering trunks, making waiſtcoats, ſhot pouches, and ſeveral other conveniences. The fleſh of theſe animals, and even of porpoiſes, formerly found a place at the tables of the great, as appears from the bill of fare of that vaſt feaſt that Archbiſhop Nevill gave in the reign of Edward IV. in which is ſeen, that ſeveral ſeals were provided on the occaſion. They couple about April, on large rocks, or ſmall iſlands, not remote from the ſhore; and bring forth in thoſe vaſt caverns that are frequent on our coaſts. They commonly bring forth two at a time, which, in their infant ſtate, are covered with a whitiſh down, or woolly ſubſtance.

They ſuckle their young for about a fortnight, in the place where they were born, and then take them out to ſea, and inſtruĉt them in ſwimming, and ſeeking for their prey, which conſiſts chiefly of ſea weed. When the young are fatigued, the parents are ſaid to carry them on their backs. The growth of the young ſeals is ſaid to be ſo rapid, that, in about nine tides after their birth, they become as aĉtive as their parents.

Seals are very ſwift in their proper depth of water, dive like a ſhot, and in a trice riſe at 50 yards diſtance; ſo that weaker fiſhes cannot avoid their tyranny, except in ſhallow water; a perſon of the pariſh of *Sennon*, ſaw, not long ſince, a ſeal in purſuit of a mullet (that ſtrong and ſwift fiſh): the ſeal turned it to and fro in deep water, as a greyhound does a hare. The mullet at laſt found it had no way to eſcape, but by running into ſhoal water: the ſeal purſued, and the mullet, to get more ſecurely out of danger, threw itſelf on its ſide, by which means it darted into ſhoaler water than it could have ſwam in with the depth of its haunch and fins, and ſo eſcaped.

They ſleep on rocks ſurrounded by the ſea, or on the leſs acceſſible parts of our cliffs, left dry by the ebb of the tide; and if diſturbed by any thing, take care to tumble over the rocks into the ſea. They are extremely watchful, and never ſleep long without moving; ſeldom longer than a minute, then raiſe their heads, and if they hear or ſee nothing more than ordinary, lie down again, and ſo on, raiſing their heads a little, and reclining them alternately, in about a minute's time. Nature ſeems to have given them this precaution, as being unprovided with auricles, or external ears; and conſequently not hearing very quick, nor from any great diſtance.

When taken young, theſe animals may be domeſticated, will follow their maſter like a dog, and come to him when called by name. Some years ago a young ſeal was thus domeſticated that had been taken at a little diſtance from the ſea. It was uſually kept in a veſſel full of ſalt water, but was allowed to crawl about the houſe, and would ſometimes come near the fire; its natural food was regularly brought to it, and it was every day taken to the ſea, and thrown in from a boat, but would ſwim after the boat, and always allowed itſelf

Feræ. ſelf to be taken back. It lived in this way for ſeveral weeks, and appears to have died in conſequence of ill uſage.

59 Canis.

Gen. 15. Canis. *Dogs.*

Six cutting teeth in each jaw; the lateral of the upper jaw longer and diſtant, the intermediate lobated; the lateral of the lower jaw lobated. Canine teeth ſolitary and curved. Grinders ſix or ſeven, or more than in the other genera of this order.

The individuals of this genus, like thoſe of the next, have ſo little in common with reſpect to their habits and manners, and are otherwiſe ſo important in themſelves, as to call for a ſeparate account. Without making any general remarks here, we ſhall merely give the ſpecific differences, and then proceed to ſuch of the ſpecies as are moſt worthy of notice.

There are about 23 ſpecies; viz.

1. * *Canis Familiaris*, Common Dog. Recurved tail, turned towards the left.—2. *C. Lupus*, Wolf. Tail incurvated.—3. *C. Mexicanus*, Mexican wolf. Tail deflected; body aſh-coloured, and variegated with duſky bands and fulvous ſpots.—4. *C. Lycaon*, Black wolf. Tail ſtraight.—5. *C. Hyæna*, Hyæna. Pale brown, ſtriped with black, with upright mane, naked ears, ſtraight tail and four-toed feet. 6. *C. Crocata*, Spotted hyæna. Reddiſh brown, ſpotted with black; with ſtraight tail, and four-toed feet.—7. *C. Aureus*. Jackall. Pale fulvous, with ſtraight tail.—8. *C. Meſomelos*, Cape jackall. Ferruginous, with ſtraight tail, and black dorſal band.—9. *C. Barbarus*, Barbary jackall. Pale brown with ſtraight tail; a black deſcending forked band behind each ear, and three duſky bands on the tail.—10. *C. Ceilonicus*, Ceyloneſe dog. Yellowiſh gray, with lengthened ſnout, long ſharp pointed tail, and crooked claws.—11. * *C. Vulpes*, Fox. Tail ſtraight tipped with white.—12. *C. Alopex*, Brant fox. Tail ſtraight, tipped with black.—13. *C. Corſac*, Corſac fox. Tail ſtraight, fulvous, with the baſe and tip white.—14. *C. Karagan*, Karagan fox. Tail ſtraight; body gray, and ears black.—15. *C. Cinereo-argenteus*, Fulvous-necked fox. Aſh gray, with ſtraight tail; and the ſides of the neck fulvous.—16. *C. Virgineanus*, Virginian fox. Whitiſh gray, with ſtraight tail.—17. *C. Argentatus*, Silvery fox. Deep brown, with longer hairs of a ſilvery white. 18. *C. Lagopus*, Arctic fox. Tail ſtraight, feet covered with thick fur.—19. *C. Thous*, Surinam dog. Grayiſh, white beneath, with deflected tail.—20. *C. Bengalenſis*, Bengal fox. Light brown, with a longitudinal black ſtripe down the face, white orbits, fulvous legs, and tail tipped with black.—21. *C. Fuliginoſus*, Sooty fox Of a ſooty colour, with ſtraight tail—22. *C. Antarcticus*, Antarctic fox. Cinereous brown, villous; tail tipt with white.—23. *C. Zerda*, Fennec. Whitiſh, with ſtraight tail, and very large upright ears, that are internally of a roſe colour.

60 Domeſtic Dog.

1. *C. Familiaris*. Domeſtic dog.—The varieties of the common dog are ſo numerous, that it is ſcarcely poſſible to give any general deſcription of the ſpecies that would apply to all. We ſhall here, therefore, only give Linnæus's characteriſtic picture, as modified by Mr Daniel, and then enumerate the ſeveral varieties with Linnæus's characters, marking with a ſtar thoſe that are generally found in this country.

History of the Species.

The dog eats fleſh and farinaceous vegetables, but not greens (*this is a miſtake, for they will eat greens when boiled*): its ſtomach digeſts bones; it uſes the tops of graſs as a vomit; is fond of rolling in carrion; voids its excrements on a ſtone; its dung (the *album græcum*) is one of the greateſt encouragers of putrefaction; it laps up its drink with its tongue; makes water ſideways, by lifting up one of its hind legs; is moſt diuretic in the company of a ſtrange dog, and very apt to repeat it where another dog has done the ſame: *Odorat anum alterius; menſtruans catulit cum variis; mordet illa illos; cohæret copula junctus.* Its ſcent is moſt exquiſite when its noſe is moiſt; it treads lightly on its toes, ſcarcely ever ſweats, but when hot lolls out its tongue; generally walks frequently round the place it intends to lie down on; its ſenſe of hearing is very quick; when aſleep, it dreams. It goes with young 63 days, and commonly brings from four to ten; the male puppies reſemble the dog, the female the bitch (*an aſſertion by no means accurate, any more than the tail always bending to the left, is a common character of the ſpecies*). It is the moſt faithful of animals, is very docile, fawns at its maſter's approach; runs before him on a journey; often paſſes over the ſame ground; on coming to croſs ways ſtops, and looks back; drives cattle home from the field; keeps herds and flocks within bounds, protects them from wild beaſts; points out to the ſportſman the game, brings the birds that are ſhot to its maſter; will turn a ſpit; at Bruſſels, and in Holland, draws little carts to the herb-market; in more northern regions, draws ſledges with proviſions, travellers, &c.; will find out what is dropt; watchful by night, and when the charge of a houſe or garden is at ſuch times committed to him, his boldneſs increaſes, and he ſometimes becomes perfectly ferocious; when he has been guilty of a theft, ſlinks away with his tail between his legs; eats voraciouſly with oblique eyes; enemy to beggars; attacks ſtrangers without provocation; hates ſtrange dogs; howls at certain notes in muſic, and often urines on hearing them; will ſnap at a ſtone thrown at it; is ſick at the approach of bad weather (*a remark vague and uncertain*); is afflicted with worms; ſpreads its madneſs; grows blind with age; *ſæpe gonorrhœa infectus;* driven as unclean from the houſes of the Mahometans; yet the ſame people eſtabliſh hoſpitals for, and allow them daily food.

1. * *Shepherd's dog;* ears erect, tail woolly underneath. 61 Varieties.

2. *Wolf-dog;* hair on the head long, ears erect, tail very much curved on the rump.

3. *Siberian dog;* ears erect, hair all long.

4. *Iceland dog;* ears erect, tips pendulous, hair long, except on the ſnout.

5. *Water-dog;* hair long, curled like a ſheep.

6. * *Little water-dog;* leſs; hair long, curled, round; the ears long, and hanging down.

7. *King Charles' dog;* head leſs, rounded; ſnout ſhort, tail curved back.

8. * *Spaniel;* ears long, woolly, pendulous.

9. *Malteſe dog;* hair ſoft, ſilky, very long.

10. *Lion dog;* very ſmall; hair on the body and tail ſhorter.

11. *Danish dog*; ears small, semipendulous; snout small, acute; legs ſlender.

12. *Baſtard pug-dog*; ears ſmall, ſubpendulous; noſe thick, flattiſh.

13. * *Pug-dog*; noſe crooked upwards; ears pendulous; body ſquare.

14. * *Bull-dog*; ſides of the lips pendulous; body robuſt; ſize of a wolf.

15. * *Maſtiff*; very large; ſides of the lips pendulous; body robuſt.

16. *German hound*; ears pendulous; a ſpurious claw on the hind feet.

17. * *Hound*; ears pendulous; a ſpurious claw on the hind feet; whitiſh.

18. * *Bloodhound*; very ſagacious.

19. * *Pointer*; tail truncate; ſpotted.

20. *Barbet*; tail truncate; hair long, coarſe.

21. * *Greyhound*; head long; ſnout robuſt; ears ſmall, ſubpendulous; legs long, ſtout; body long, ſlender.

22. *Iriſh greyhound*; body curved; ſnout narrowing; ſize of 15.

23. *Turkiſh greyhound*: body curved; ſnout tapering; hair a little curled; ſize of 25.

24. *Common greyhound*; body curved; ſnout tapering; ſize of a wolf.

25. *Rough greyhound*; body curved; ſnout tapering; hair longer, curled; ſize of a wolf.

26. *Italian greyhound*; leſs; body curved; ſnout tapering.

27. *Naked dog*; body naked.

28. *Oriental dog*; tall, ſlender; ears pendulous; hair on the tail very long, hanging down.

29. * *Lurcher*; body narrow; legs ſtout; tail ſtrong, ſtraight; hair ſhort, thick ſet.

30. *Rough lurcher*; body narrow; legs ſtout; tail thick, ſtraight; hair long, rough.

31. *Boar lurcher*; head and ſnout thick; body narrow behind; feet long; hair long, rough.

32. * *Turnſpit*; legs ſhort; body long, often ſpotted.

33. *Alco*; head ſmall; ears pendulous; back curved; tail ſhort; ſize of 9.

34. *New Holland dog*; tail buſhy, pendulous; ears ſhort, erect; ſnout pointed.

Of theſe, the *ſhepherd's dog*, the *Siberian dog*, the *bull dog*, the *maſtiff*, the *hound*, the *bloodhound*, the *greyhound*, the *Iriſh greyhound*, and the *terrier*, are the moſt deſerving of our attention. We ſhall make a very few remarks on each, and ſhall take occaſion to interſperſe a few anecdotes characteriſtic of the ſagacity, cunning, ſtrength, or courage, of this moſt valuable ſpecies.

62 Shepherd's Dog. Fig. 22.

The *Shepherd's dog* is ſuppoſed by many to be the original ſtock whence moſt of the other varieties are derived. This is one of the moſt uſeful of the ſpecies, and is ever faithful to his charge. This ſagacious animal is of the greateſt importance in thoſe large tracts of land which in many parts of our iſland are appropriated to the feeding of ſheep and cattle, and where vaſt flocks may be ſeen ranging without controul, their only guides being the ſhepherd and his dog. This animal is ſtrictly attentive to the commands of his maſter, and always prompt in the execution of them. He is the watchful guardian of the flock, keeps them together, and often drives them by himſelf from one paſture to another. We have heard of one of theſe dogs who was employed by a farmer in the ſouth of Scotland to ſteal other people's ſheep. His maſter had only to point out to him beforehand the ſheep which he wiſhed to appropriate to himſelf, and to ſend the dog at a convenient time to fetch them home. This charge he was ſure to execute with the utmoſt punctuality and addreſs. The proprietors of the ſtolen ſheep were ſurpriſed at their loſs, when they could not diſcover the perſon who had robbed them. The maſter of the dog was at length detected and hanged.

Mr Bewick ſpeaks of a remarkable ſingularity in the feet of the ſhepherds dogs in the northern parts of this iſland, viz. their having one or two toes more than other dogs, which appear to be deſtitute of muſcles, and hang dangling behind like an unnatural excreſcence. This, however, is not peculiar to the ſhepherd's dog, but is found in the ſpaniel, pointer, and hound.

Siberian Dog.

The *Siberian* or Greenland dog is a moſt uſeful animal to the inhabitants of the dreary regions of North America, and the north eaſt of Aſia, eſpecially Greenland and Kamtſchatka. It bears a conſiderable reſemblance to the ſhepherd's dog, but is much larger, and has more ſhaggy hair, and a more buſhy tail. It is ferocious and ſavage, and rather howls than barks. It is principally employed in drawing ſledges acroſs the frozen ſnow; ſeveral of theſe animals being faſtened to the ſledge, which they draw with ſo much ſpeed, that they have been known to perform a journey of 270 miles in leſs than four days.

The ſledges are uſually drawn by five dogs, four of them yoked two and two abreaſt: the fifth remaining ſingle as a leader to the reſt. The reins are faſtened to a collar round the leading dog's neck, but are of little uſe in directing the pack, the driver depending chiefly upon their obedience to his voice, with which he animates them to proceed. Great care and attention are conſequently uſed in training up thoſe intended for leaders, which are more valuable according to their ſteadineſs and docility; the ſum of 40 rubles, or 10l. being no unuſual price for one of them. The rider has a crooked ſtick, anſwering the purpoſe both of whip and reins, with which, by ſtriking on the ſnow, he regulates the ſpeed of the dogs, or ſtops them at his pleaſure. When they are inattentive to their duty, he often chaſtiſes them by throwing it at them. He diſcovers great dexterity in regaining his ſtick, which is the greateſt difficulty attending his ſituation; for if he ſhould happen to loſe it, the dogs immediately diſcover the circumſtance, and ſeldom fail to ſet off at full ſpeed, and continue to run till their ſtrength is exhauſted, or till the carriage is overturned and daſhed to pieces, or hurried down a precipice.

64 Bull-Dog.

The *Bull-dog* is the fierceſt of the ſpecies, and in courage is ſcarcely excelled by any creature in the world. It is of a low ſtature, but very ſtrong and muſcular; has a ſhort noſe, and its under jaw projects forward, ſo as to render its aſpect fierce and unpleaſing. The cruel purpoſe for which theſe animals were formerly much employed, viz. bull-baiting, is now, much to the credit of the preſent times, going faſt out of faſhion, and we ſhould hope, in the courſe of another century, will be entirely aboliſhed. The uncommon ardour and obſtinacy diſplayed by theſe dogs in attacking the bull, [illegible] bull, even under the greateſt pain, are well illuſtrated by the following fact, related by Mr Bewick. Some years ago at a bull-baiting in the north of England, a young man, confident of the courage of his dog, laid ſome trifling wager, that he would, at ſeparate times, cut off all the four feet of his dog, and that it would, after each amputation, ſtill attack the bull. The inhuman experiment was tried, and the dog continued to ſeize the bull as eagerly as at firſt.

65
Maſtiff. Fig. [illegible] The *Maſtiff* is one of the largeſt and ſtrongeſt dogs, and one of thoſe for which this country is particularly famous. His principal office is that of guarding and ſecuring houſes, gardens, and other property, and for this he is admirably calculated, both from his ſtrength and courage. The power of this dog was put to a ſevere trial in the reign of James I. when three of them were made to attack a lion. The reſult of the engagement is thus related by Stow. "One of the dogs being put into the den, was ſoon diſabled by the lion, which took it by the head and neck, and dragged it about; another dog was then let looſe, and ſerved in the ſame manner; but the third being put in, immediately ſeized the lion by the lip, and held him for a conſiderable time, till being ſeverely torn by his claws, the dog was obliged to quit his hold, and the lion, greatly exhauſted in the conflict, refuſed to renew the engagement; but taking a ſudden leap over the dogs, fled into the interior part of his den. Two of the dogs ſoon died of their wounds; the laſt ſurvived, and was taken great care of by the king's ſon, who ſaid, he that had fought with the king of beaſts, ſhould never after fight with any inferior creature."

M. D'Obſonville relates an inſtance of memory in a maſtiff, which exceeds any thing of which even the human race ſeems capable. This dog, which had been brought up by him in India from a puppy, accompanied himſelf and a friend from Pondicherry to Benglour, a diſtance of above 300 leagues. The journey occupied nearly three weeks, and they had to traverſe plains and mountains, to ford rivers, and go through ſeveral bye-paths. The dog, which had certainly never before been in that country, loſt his maſter at Benglour, and immediately returned to Pondicherry. He went directly to the houſe of a friend of M. D'Obſonville's, with whom that gentleman had generally reſided. Now the difficulty is, not ſo much to know how the dog ſubſiſted on the road (for he was very ſtrong, and able to procure himſelf food), but how he ſhould ſo well have found his way, after an interval of more than a month.

An anecdote related by Mr Bewick ſhews that the maſtiff poſſeſſes forbearance equal to his courage, and that he diſdains to attack an inferior foe, while he knows how to chaſtiſe his impertinence. A large dog of this kind belonging to the late M. Ridley, eſq. of Heatton, near Newcaſtle, being frequently moleſted by a mongrel, and teazed by its continual barking, at laſt took it up in his mouth by the back, and with great compoſure dropped it over the quay into the river, without doing any farther injury to an enemy ſo much his inferior.

66
Fox-hound. Fig. 24. There are ſeveral varieties of hounds, as the fox-hound, the beagle, and the harrier. Of theſe the fox-hound moſt merits our attention.

The *Fox-hounds* of Britain are conſidered as ſuperior in ſwiftneſs, ſtrength, and activity, to thoſe of every other country in Europe. As fox-hunting forms one of the moſt favourite diverſions among our country gentlemen, the greateſt attention is paid to the breeding, education, and maintenance of the fox-hounds: and the climate ſeems ſo congenial to their nature, that they will thrive nowhere elſe. It is aſſerted that when our fox-hounds are carried over to the continent, they always degenerate.

The proper ſhape of a fox-hound is of conſiderable conſequence, for if he is not of perfect ſymmetry he will neither run faſt nor bear hard work, and in a fox-chaſe, both great ſpeed and ſtrength are required. According to Mr Daniel, his legs ſhould be as ſtraight as arrows, his feet round and not too large; his ſhoulders ſhould lie back; his breaſt ſhould be rather wide than narrow; his cheſt deep, his back broad, his neck thin his head moderately ſmall, his tail thick and buſhy.

Fox-hounds are ſometimes employed to hunt the ſtag, and there is on record a remarkable inſtance of the ſtoutneſs diſplayed by theſe dogs in ſuch a chaſe. Many years ſince a ſtag was hunted from Whinfield park, in the county of Weſtmoreland, until by fatigue or accident the whole pack was thrown out, except two fox-hounds, bred by Lord Thanet, who continued the chaſe the greateſt part of the day. The ſtag returned to the park from whence he had been driven, and as his laſt effort leapt the wall, and died as ſoon as he had accompliſhed it. One of the hounds ran to the wall, but being unable to get over it, lay down, and almoſt immediately expired: the other hound was found dead about half a mile from the park. The length of this chaſe is uncertain, but as they were ſeen at Red-kirks, near Annan, in Scotland, diſtant by the poſt-road about 46 miles, it is conjectured that the circuitous courſe they took, could not make the diſtance run, leſs than 120 miles.

The following anecdote is an admirable proof of the ſagacity of the fox-hound. Two gentlemen had their hounds at Whinneck, Northamptonſhire, and uſed ſometimes to go to Lutterworth in Leiceſterſhire for a fortnight's hunting. A favourite hound was left in Northamptonſhire, on account of not being quite ſound. The firſt day's hunting from Lutterworth produced an extraordinary chaſe, in which the hounds and horſes were ſo tired, that it was deemed neceſſary to ſtop that night at Leiceſter. Upon their arrival next day at Lutterworth, they were told that a hound (which anſwered the deſcription of that left in Northamptonſhire), came there ſoon after their going out the preceding morning, and waited quietly until towards the evening; he had then ſhown ſigns of uneaſineſs, and in the morning had diſappeared. It was concluded that, diſappointed of finding his companions where he expected, the hound, whoſe name was *Dancer*, had returned to Whinneck; but to the ſurpriſe and concern of his maſters, upon their returning home, they were informed that the hound had come back from Leiceſterſhire, ſtaid one day at the kennel, and then left it. Every poſſible inquiry was made, at length it was diſcovered that Dancer, upon not finding the pack either at Lutterworth or Whinneck, had proceeded into Warwickſhire, to a Mr Newcome's, where the hounds had been [illegible] for a week ſome months before *.

The *Beagle* [illegible]

Rural

anceſtors, and was ſo remarkable for the fineneſs of its ſcent, that they employed it for recovering game that had eſcaped wounded from the hunters. It would alſo follow with conſiderable certainty the footſteps of a man to a great diſtance. In barbarous and uncivilized times, when a thief or murderer had fled, the blood-hound would trace him through the thickeſt and moſt ſecret coverts, and ceaſed not the purſuit till it had ſeized the felon. This is finely deſcribed by Somerville in his poem of The Chaſe.

67 Blood-hound.

Mr Boyle relates a ſtory that ſhews the extreme acuteneſs of this dog's ſmell, as well as his ſurpriſing ſagacity. A perſon of quality, to make a trial whether a young blood-hound was well inſtructed, cauſed one of his ſervants to walk to a town four miles off, and then to a market town three miles from thence. The dog, without ſeeing the man he was to purſue, followed him by the ſcent to the above-mentioned places, notwithſtanding the multitude of market-people that went along the ſame way, and of travellers that had occaſion to croſs it; and when the blood-hound came to the chief market-town, he paſſed through the ſtreets without taking notice of any of the people there, and left it not till he had gone to the houſe where the man he ſought reſted himſelf, and he found him in an upper room, to the wonder of thoſe that followed him.

Blood-hounds are ſtill employed in the ſouthern part of the kingdom, either for recovering wounded deer, or for purſuing deer-ſtealers, whom they infallibly trace by the blood that iſſues from the wounds of their victims.

68 Grey-hound. Fig. 26.

The *Greyhound* is the fleeteſt of all dogs, and can out-run every animal of the chaſe; but as it has not the fine ſcent of other hounds, it can purſue only by the eye, and muſt be indebted for ſucceſs to its aſtoniſhing ſpeed. The ſwiftneſs of this dog is ſo great that a ſwift horſe can do little more than keep up with him, and his ardour in purſuit of game is ſuch as not unfrequently to occaſion his death.

Greyhounds were formerly held in ſuch repute as to be conſidered a moſt valuable preſent even from or to princes.

69 Iriſh Grey-hound Fig. 27.

The *Iriſh greyhound* is ſuppoſed to be the largeſt of the ſpecies, as well as the moſt beautiful and majeſtic. One deſcribed by Mr Lambert, in the third volume of the Linnæan Tranſactions, meaſured above five feet from the noſe to the tip of the tail, and they are ſaid formerly to have been of a much larger ſize. They are found only in Ireland, and even in that country are now become extremely rare. The earl of Altamont is ſaid to be the only perſon who poſſeſſes them, and his lordſhip has not more than eight. They were formerly employed in clearing the country of wolves, and are hence ſometimes called *Iriſh wolf-dog*.

70 Terrier. Fig. 25.

The *Terrier* is of two kinds, one with ſmooth gloſſy hair, commonly of a black colour, or black marked with reddiſh ſpots; and the other rough and ſhaggy, uſually of a reddiſh brown mixed with gray. This dog is generally an attendant on every pack of fox-hounds, being employed to force the fox from his kennel, in which he is very expert. He is alſo the determined enemy of rats, weazels, and other vermin, and no dog is better calculated for the abſurd and cruel ſport of baiting the badger. He is alſo a good water-dog.

Mr Hope has related an anecdote reſpecting the terrier, which ſhews that this animal is both capable of reſentment when injured, and of great contrivance in order to accompliſh his revenge; it indeed ſhews that he is poſſeſſed of a certain power of combining ideas, and communicating his thoughts to other dogs.

A gentleman of Whitmore in Staffordſhire, uſed to come twice a-year to town, and being fond of exerciſe, generally performed the journey on horſeback, accompanied moſt part of the way by a faithful little terrier dog, which, leſt he might loſe it in town, he always left to the care of Mrs Langford, the landlady at St Alban's; and on his return he was ſure to find his little companion well taken care of. The gentleman calling one time, as uſual, for his dog, Mrs Langford appeared before him with a woeful countenance:—Alas! ſir, your terrier is loſt! Our great houſe-dog and he had a quarrel, and the poor terrier was ſo worried and bit before we could part them, that I thought he could never have got the better of it. He, however, crawled out of the yard, and no one ſaw him for almoſt a week: he then returned, and brought with him another dog, bigger by far than ours, and they both together fell on our great dog, and bit him ſo unmercifully, that he has ſcarcely ſince been able to go about the yard, or to eat his meat. Your dog and his companion then diſappeared, and have never ſince been ſeen at St Alban's. The gentleman heard the ſtory with patience, and endeavoured to reconcile himſelf to his loſs. On his arrival at Whitmore, he found his little terrier; and on inquiring into circumſtances, was informed that he had been at Whitmore, and had coaxed away the great dog, who it ſeems had, in conſequence, followed him to St Alban's, and completely avenged his injury.

71 Speaking-dog.

The above anecdote, with others which we have before given, are abundantly ſufficient to ſhew the great ſagacity of the dog; but of all the qualifications that have been attributed to him, that of learning to ſpeak muſt appear the moſt extraordinary. The French academicians, however, have given us an account of a dog in Germany which would call for tea, coffee, chocolate, &c. The account was communicated to the Royal Academy by the celebrated Leibnitz, and in ſubſtance is as follows: "This dog was of a middling ſize, and was the property of a peaſant in Saxony. A little boy, the peaſant's ſon, imagined that he perceived in the dog's voice an indiſtinct reſemblance to certain words, and therefore took it into his head to teach him to ſpeak. For this purpoſe he ſpared neither time nor pains with his pupil, who was about three years old when this his learned education commenced; and at length he made ſuch a progreſs in language as to be able to articulate ſo many as thirty words. It appears, however, that he was ſomewhat of a truant, and did not very willingly exert his talents, being rather preſſed into the ſervice of literature, and it was neceſſary that the words ſhould be firſt pronounced to him each time, which he, as it were, echoed from his preceptor. Leibnitz, however, atteſts that he himſelf heard him ſpeak; and the French academicians add, that unleſs they had received the teſtimony of ſo great a man as Leibnitz, they ſhould ſcarcely have dared to report the circumſtance. This wonderful dog was born at Zeitz in Miſnia, in Saxony.*"

The fleſh of the dog is eaten by ſome ſavage nations, and we have heard of ſome epicures in this country who *fatten young puppies for their table.* The ſkin of this animal is made into leather for gloves, &c.

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* *Shaw's Zoology*, vol. i. and part 2.

For the conſtruction and management of dog kennels, ſee FARRIERY, Part iv. chap. i. ſect. 3. For the beſt method of feeding hounds, ſee chap. ii. of the ſame part; and for the diſeaſes of dogs and their treatment, eſpecially the diſtemper and canine madneſs, ſee FARRIERY, Part vi.

72 Wolf. Fig. 28.

2. *C. Lupus.* The Wolf.—The wolf is much larger, ſtronger, and more muſcular than the dog; the upper part of his face is broader, and his whole form longer; the tail too has an inward direction, and is rather long and buſhy; the opening of his mouth appears a little ſhorter in proportion than that of the dog, but his jaws are much ſtronger, his teeth larger, and his eyes placed more obliquely. His general colour is a pale gray with a caſt of yellow; but it varies much in ſhade in different parts of the world.

He is found in almoſt all the temperate and cold regions of the globe, even as high as the arctic circle. He was formerly very common in Britain and Ireland, inſomuch that King Edgar commuted the puniſhment of certain crimes into the acceptance of a number of wolves tongues, and in Wales converted the tax of gold and ſilver into an annual tribute of 300 wolves heads. Notwithſtanding theſe endeavours to extirpate the race of wolves, we find that in the reign of Edward I. theſe animals had ſo much increaſed in number, as to require a mandate from that monarch to Peter Corbet to aſſiſt in their deſtruction. In the county of Derby certain perſons held their lands by the ſuit of hunting and deſtroying the wolves that infeſted the country; whence they were called *wolve-hunt.* They infeſted Ireland many centuries after their extinction in England; for we are told that they were found there ſo lately as the year 1710. In Scotland the laſt wolf was killed in the latter end of the 17th century, by Sir Ewen Cameron of Lochiel. In the parts of America poſſeſſed by the United States, wolves are nearly extirpated; but very lately a reward of 20 or 30 ſhillings was offered for killing a wolf.

Wolves prey on all kinds of animals; but in caſe of neceſſity will feed upon carrion; in hard weather aſſemble in vaſt troops, and join in dreadful howlings. Horſes generally defend themſelves againſt their attacks, but all weaker animals fall a prey to them. Throughout France the peaſants are obliged nightly to houſe their flocks. The wolf is naturally a ſuſpicious animal, and though ſo ravenous as to devour his own ſpecies when preſſed by hunger, yet he is ſo miſtruſtful as to imagine every thing he ſees to be a ſnare laid to entrap him. If he finds a rein deer tied to a poſt for the purpoſe of being milked, he dares not approach it for fear it ſhould be placed there only to betray him; but when once the deer is let looſe, he will purſue and ſeize him. He is however, ſo cowardly, that if the animal ſtands on the defenſive, he will ſcarcely venture to attack it. They ſally forth with great caution in queſt of their prey; have a fine ſcent; hunt by noſe; they are capable of bearing long abſtinence; to allay their hunger will fill their bellies with mud; a mutual enmity ſubſiſts between the dogs and them: the female is in heat in winter, followed by ſeveral males, which occaſions great contention; goes with young ten weeks; near her time ſhe makes a ſoft bed of moſs, in ſome retired place; brings from five to nine at a birth; the young born blind. Their bite is terrible, as their ſtrength is great; the hunters therefore clothe their dogs, and guard their necks with ſpiked collars. Wolves are [illegible] the peaſant in France who kills a wolf, carries its head through the villages, and collects ſome ſmall reward from the inhabitants. The Kalmucks take the wolves by the aid of a large ſort of hawk called beſkat, which is trained for the diverſion, and will faſten on them and tear out their eyes *.

Theſe animals abound in the immenſe foreſts of Germany, where the following methods are taken to deſtroy them. In ſome very ſequeſtered part of the foreſt they hang up a large piece of carrion to the branch of a tree, having previouſly made a train of ſome miles long, leaving ſmall pieces of putrid fleſh here and there to allure the wolves to the ſpot; they then wait till it is dark, and approach the place with great circumſpection. Here they ſometimes find two or three wolves aſſembled, leaping up, and ſtretching themſelves to catch the bait, which is placed juſt within their reach; while the animals are buſily employed in this way, the hunters being provided with fire-arms, ſeldom fail to diſpatch them. Again in a convenient place, at the foot of a declivity, they make a ſmall incloſure of ſtrong poles, ſo high, that the wolf having once entered, cannot return again. An opening is left at the top of the bank; and a ſheep that has been long dead, is the bait; to which he is allured by long trains, made from different places where he is known to haunt. As ſoon as he arrives at the ſpot, he examines every part of the incloſure, and finding no other way to come at the booty, he precipitates himſelf to the bottom; and having made a plentiful meal, endeavours in vain to reaſcend. His diſappointment at not being able to get back, is productive of the moſt direful howlings, which alarm his enemies, and they either take him alive, or diſpatch him with bludgeons. It is remarkable that when this animal finds there is no poſſibility of eſcaping, his courage entirely forſakes him; and he is for ſome time ſo ſtupified with fear, that he may be killed without offering to reſiſt, or taken alive without much danger.

Notwithſtanding the ſavage ferocity of the wolf, more than one inſtance has occurred of his being tamed. Buffon brought up one which remained very quiet and docile till he was 18 or 19 month old, when he broke his fetters, and ran off, after deſtroying a number of fowls, and killing a dog with whom he had lived in the greateſt familiarity. It is ſaid that Sir Aſhton Lever had a tame wolf, which by proper education, was entirely diveſted of the ferocious character of its ſpecies.

The wolf is valuable for nothing but his ſkin, which makes a warm and durable fur.

It is now fully aſcertained that the wolf and dog will breed together, and that the breed may be continued between the mules themſelves, or between them and other dogs.

It has hence been conjectured that the wolf is the original ſtock whence the dog is derived, but the dif-

[illegible] differences between the two animals are ſo ſtriking, that this ſuppoſition muſt be abandoned in favour of ſome other animal.

73 Hyæna. Fig. [illegible]

5. *C. Hyæna.* Hyæna.—This animal is about the ſize of a large dog, though it is ſometimes found nearly ſix feet long from the root to the baſe of the tail. It is chiefly diſtinguiſhed by its great ſtrength of limbs, and a remarkable fulneſs of the ſnout, which is black; the ears are long, ſharp pointed, and nearly naked, and from the neck there runs a ſtrong briſtly mane along the upper part of the back. The tail is rather ſhort, but extremely thick and briſtly with hair. All the feet have four toes. Its uſual colour is a pale grayiſh brown, with a tawny caſt, and the whole body is marked with ſeveral blackiſh tranſverſe bands, running from the back downwards, thoſe on the legs being moſt numerous, and of the deepeſt colour.

The hyæna is found in Aſiatic Turkey, Syria, Perſia, and in ſome parts of Africa, eſpecially Barbary and Abyſſinia.

It is one of the moſt ferocious animals of which we have any account; will prey on cattle, and frequently commits great devaſtation among the flocks, and prowls about in the night to feed on the remains of dead animals, or on whatever living prey it can ſeize. Troops of hyænas ſometimes aſſemble, and follow the movements of an army, in order to feaſt on the bodies of the ſlain. The will even violate the repoſitories of the dead, and greedily devour the putrid contents of the grave. The courage of this animal is equal to its rapacity, and on occaſion he will obſtinately defend himſelf againſt much larger animals. He will ſometimes attack the ounce and the panther, and Kæmpfer ſpeaks of one that he ſaw put two lions to flight. This character, however, ſeems not to apply to the hyænas of Barbary; for we are told by Mr Bruce, that he has ſeen the Moors in the day time take this animal by the ears, and drag him along without his offering any other reſiſtance than drawing back. The Abyſſinian hyænas on the contrary, are extremely bold, and infeſt the towns ſo much in the night, that it is dangerous to ſtir out after dark. Mr Bruce tells us, that they were a plague in Abyſſinia in every ſituation, both in the city and in the field, and he thinks ſurpaſſed even the ſheep in number. "Gondar was full of them, from the time it became dark till the dawn of day, ſeeking the different pieces of ſlaughtered carcaſes, which this cruel and unclean people expoſe in the ſtreets without burial, and who firmly believe that theſe animals are Falaſha from the neighbouring mountains, transformed by magic, and come down to eat human fleſh in the dark in ſafety. Many a time in the night, when the king had kept me late in the palace, and it was not my duty to lie there, in going acroſs the ſquare from the king's houſe, not many hundred yards diſtant, I have been apprehenſive leſt they ſhould bite me in the leg. They grunted in great numbers about me, although I was ſurrounded with ſeveral armed men, who ſeldom paſſed a night without wounding or ſlaughtering ſome of them.

"One night in Maitſha, being very intent on an obſervation, I heard ſomething paſs behind me towards the bed; but upon looking round, could perceive nothing. Having finiſhed what I was then about, I went out of my tent, reſolving directly to return, which I immediately did, when I perceived two large blue eyes glaring at me in the dark. I called upon my ſervant with a light, and there was the hyæna ſtanding near the head of the bed, with two or three large bunches of candles in his mouth. To have fired at him, I was in danger of breaking my quadrant or other furniture; and he ſeemed, by keeping the candles ſteadily in his mouth, to wiſh for no other prey at that time. As his mouth was full, and he had no claws to tear with, I was not afraid of him, but with a pike ſtruck him as near the heart as I could judge. It was not till then that he ſhewed any ſign of fierceneſs; but upon feeling his wound, he let drop the candles, and endeavoured to run up the ſhaft of the ſpear to arrive at me; ſo that, in ſelf defence, I was obliged to draw my piſtol from my girdle and ſhoot him; and nearly at the ſame time my ſervant cleft his ſkull with a battle-axe. In a word, the hyæna was the plague of our lives, the terror of our night walks, and the deſtruction of our mules and aſſes; which above all others, is his favourite food."

The voice of this animal is ſingular, beginning ſomewhat like the moaning of a human voice, and ending like a perſon making a violent effort to vomit.

Hyænas generally inhabit caverns and rocky places, where they keep themſelves retired during the day.

There is ſaid to be a remarkable particularity in this animal, viz. that when it is firſt diſlodged from cover, and obliged to run, it always appears lame for a conſiderable ſpace, ſometimes to ſuch a degree as would lead people to ſuppoſe one of his hind legs to be broken, though after running for ſome time this affection goes entirely off.

There is ſomething peculiarly ſavage and gloomy in the aſpect of the hyæna, which ſeems to indicate an extreme malignity of diſpoſition, and his manners while in captivity ſeem to correſpond with this appearance, being in general fierce and untractable. The opinion ſo decidedly maintained by moſt keepers of wild beaſts, that the hyæna cannot be tamed, appears, however, to be erroneous, as there are at leaſt two inſtances of the contrary on record, one by Mr Pennant, who declares that he ſaw a hyæna that had been rendered as tame as a dog, and the other by Buffon, who aſſures us, that in an exhibition of animals at Paris, in the year 1773, there was a hyæna which had been tamed very early, and was apparently diveſted of all its natural malevolence of diſpoſition.

74 Jackal. Fig. [illegible]

7. *C. Aureus.* Jackal. In external figure the jackal reſembles the wolf more than the fox. It is alſo larger, and ſtands higher on its legs than the fox. The head is of a fox-red above, mixed with aſh gray hairs, which have each a blackiſh ring and tip; the upper lip is white on each ſide of the noſe, and the throat is of the ſame colour; the whiſkers, the long hairs on the chin, and thoſe above the eyes, which are five in number, are black; the ears are fox-red externally, and white internally; the neck and back are all over gray yellow, and both, but eſpecially the latter, are daſhed with a ſhade of duſky, owing to the tips of the long hairs on thoſe parts; the under parts of the body and the legs are of a light reddiſh yellow, but the ſhoulders and thighs are externally of a fox-red; the claws are black; the thumb claw ſtands higher than in the dog, and is crooked; the tail is ſtraight, ſomewhat longer,

Feræ.

and more hairy than in the wolf, and is of a greyiſh yellow, more inclining to fox-red towards the end; the long hairs have black tips, and conſequently the tip of the tail appears black; the hair of the jackal is ſtronger and coarſer than that of the wolf, and is longeſt on the ſhoulders and tail, where it meaſures four inches; on the neck and back it is ſhorter by an inch; between the hairs is ſituated a woolly fur of a gray colour. The four middle front teeth are of a truncated form, or if cut off, flat, not perceptibly notched or indented; the two exterior larger ones in the upper jaw are ſomewhat carinated, in the lower rounded; the ſide or canine teeth in the upper jaw are ſomewhat larger than in the under; the grinders are ſix on each ſide, the firſt being the ſmalleſt, and of a conical ſhape; the next grinders, to the number of two in the upper and three in the lower, are gradually larger, and divided into three points: the fourth of the upper jaw and the fifth of the under are the largeſt, and have two points: the remaining ones ſtand deeper in the jaw, or more inwards, and are ſmaller than the preceding; the tongue has on each ſide a border or row of ſmall verrucæ or warts.

The female breeds only once a year, goes with young about four weeks, and brings forth from ſix to eight at a time.

Jackals go in packs of 40, 50, or even 200 at a time, and hunt like hounds in full cry, from evening to morning. They are leſs deſtructive to poultry than the wolf; they ravage the ſtreets and villages, and gardens, and will even deſtroy children, if they are left unprotected. They will enter ſtables and out-houſes, and eat any materials made of leather; they will familiarly come into a tent, and carry off whatever they can take from the ſleeping traveller. For want of living prey, they will devour putrid carcaſes, eat the moſt infected carrion, and even diſinter the dead, for which reaſon the graves in many countries are made of a great depth. Like the hyæna they will follow armies, in hopes of feaſting on the ſlain. When they cannot get animal food, they will even feed on fruits and roots. They burrow in the earth, and lie there all the day, coming out at night to hunt. They hunt by the noſe, and are very quick in ſcent, filling the air with the moſt horrid howlings when they begin the chaſe. The lion, panther, and other beaſts of prey, take advantage of the general conſternation, and follow the jackals in ſilence till they have hunted down their prey, when they come up and devour the fruits of the jackal's labours, leaving them only the remains of the ſpoil. Hence the jackal has been vulgarly termed the *lion's provider*.

There is great reaſon to believe that the jackal forms the primeval ſtock from which the domeſtic dog has originated. The external form, internal ſtructure, and manners of both are very ſimilar. According to Mr Guldenſtadt, the jackal has a natural propenſity to follow mankind, inſtead of flying from him like the wolf or the fox; the whelp of the jackal is readily tamed, and when grown up, aſſumes all the habits of the domeſtic dog; fawns on his maſter, expreſſes his joy by wagging his tail, throws himſelf on his back, murmurs gently, diſtinguiſhes his name, jumps on the table, &c. The jackal and dog alſo readily breed together, as appears from [illegible].

[illegible]

11. *C. Vulpes.* Fox. The fox is found in all the temperate regions of the globe: throughout Europe, and great part of Aſia; he abounds in North America, but is ſcarcely met with in Africa, except in Barbary. It is very common in this iſland. There are ſeveral varieties of the common fox; and three of theſe, viz. the *greyhound*, the *maſtiff*, and the *cur fox*, are met with in Britain. Of theſe the greyhound is the largeſt, and is chiefly found in the mountainous parts of this iſland; the cur is the ſmalleſt, but the moſt common.

Foxes differ very much in point of colour, according to the climate which they inhabit. In Britain they are uſually of a yellowiſh brown colour, with white or aſh-coloured marks on the forehead, ſhoulders, hind part of the neck, and outſide of the hind legs; the lips, throat, and cheeks are white, and there is uſually a white ſtripe running along the under ſide of the legs; the breaſt and belly whitiſh gray, mixed with aſh colour; the tips of the ears and feet are black, and the tail is of a reddiſh yellow, with the tip white. In general form the fox much reſembles the dog, except that his head is larger in proportion to his body, his ſnout more pointed, his ears ſhorter, and his tail more long and buſhy. His eyes are prominent and piercing, of a lively hazel colour, and very expreſſive of the ſeveral paſſions by which the animal is agitated.

The ſmell of this animal is proverbially ſtrong and offenſive, and is ſaid to reſemble ſo exactly that of the root of crown imperial, (*fritillaria imperialis*, Lin.) as ſcarcely to be diſtinguiſhed from it. It has however been remarked, that from a ſpot at the baſe of the tail, there proceeds an odour which has been compared to that of violets. He poſſeſſes the faculty of ſmelling in a degree equal to the dog, and can ſcent his food or his foe at the diſtance of ſome hundred yards. He has a yelping kind of bark, conſiſting of a quick ſucceſſion of ſimilar tones, concluding in an elevation of the voice, ſomething like the cry of a peacock. He yelps much when in heat, and during winter, eſpecially in froſt and ſnow; but in ſummer he is almoſt entirely ſilent. In ſummer he caſts his hair.

The fox chooſes his habitation in brakes, woods, or coppices; and here he prepares his bed below hard ground, the roots of trees, or ſimilar ſituations, where he can make proper outlets to eſcape danger. The fox's bed, in the language of hunters, is called his *kennel;* when he retires to it, he is ſaid to *go to earth*, and when forced from it by his purſuers, he is ſaid to be *unkenneled*. Foxes have been known to form their beds in hollow trees, that they may the better ſecure their young. This animal does not always take the trouble to conſtruct a hole for himſelf, but often procures one by diſpoſſeſſing the badger, which he does, as is ſaid, by depoſiting his urine in the badger's hole, and thus obliging that cleanly animal to abandon his contaminated dwelling. He uſually fixes his habitation not far from the dwellings of man, eſpecially in the neighbourhood of farm yards. He generally keeps retired during the day, though ſometimes he may be ſeen in clear warm weather baſking in the ſunſhine in ſome dry place, and ſometimes amuſing himſelf with running round after his tail. He is ſo much attached to his [illegible], that it is not eaſy to induce him to leave [illegible] it for another, and the ſame fox has been caught in the ſame place four ſeveral times, having repeatedly after his eſcape made for his old cover*.

The food of the fox conſiſts chiefly of birds, eſpecially game and poultry, and of the leſſer quadrupeds, as of young hares, rabbits, and even field mice, rats, lizards, toads, and ſerpents. The greyhound fox is ſaid to attack ſheep, and carry off young lambs. When preſſed by hunger he will eat carrion, roots, and inſects, and near the ſea coaſt will feed on crabs, ſhrimps, or ſhell fiſh. He is very fond of grapes, and in France and Italy often does great miſchief among the vines. He is ſaid alſo to be fond of honey, for which he will attack the bee-hives, and though obliged repeatedly to make off by the fury of the enraged bees, after ridding himſelf of his enemies by rolling on the ground and killing them, he ſucceſſively returns to the charge, and ſeldom fails to make himſelf maſter of the booty.

In his attack upon the neighbouring poultry, he chooſes his time with judgement; and concealing his road, glides forward with caution. If he can leap the fence, or get in below it, he ravages the yard, puts all the poultry to death, and then takes meaſures for ſecuring what he has killed. He retires ſoftly with his prey, which he either hides in holes that he digs for that purpoſe, carefully covering it with earth, or carries it to his kennel if this be near; in a few minutes he returns for more, which he conceals in a ſimilar manner, but in a different place, and he will thus carry off a whole flock of poultry, one by one, to his hiding places, thruſting them in with his noſe, and leaving them till hunger calls for a ſupply. In this way he proceeds till the riſing of the ſun, or ſome noiſe about the farm houſe, gives him notice that it is time to retire.

In procuring young rabbits from their burrows, he exhibits a great degree of cunning. He does not enter the hole, for as this is very narrow, he would be obliged to dig ſeveral feet along the ground below the ſurface: but he follows the ſcent of the rabbits above, till he comes to the end where they lie, and then ſcratching up the earth, deſcends upon them and devours them.

When foxes are in heat they are ſaid by ſportſmen to go to *clicket;* this takes place in winter: the females produce but once a year, and have from three to ſix young ones at a birth. While breeding, the bitch ſeldom lies far from the earth, and after littering, if ſhe perceives her retreat to be diſcovered, ſhe removes her cubs one by one to ſome more ſecure ſituation. The cubs are uſually firſt found in the latter end of March; when brought forth, they are blind like puppies, and of a very dark brown colour; they grow for 18 months, and live about 13 or 14 years. The fox is exceedingly careful of her young, and a remarkable inſtance of her parental affection is recorded by Goldſmith. A ſhe fox that had, as it ſhould ſeem, but one cub, was unkenneled by a gentleman's hounds, and hotly purſued. The poor animal braving every danger, rather than leave her cub behind to be worried by the dogs, took it up in her mouth, and ran with it in this manner for ſome miles; at laſt, paſſing through a farmer's yard, ſhe was aſſaulted by a maſtiff, and obliged to drop her cub, which was taken up by the farmer. It is pleaſing to add that the affectionate creature got off in ſafety.

The fox and the dog readily breed together, and the produce is a very uſeful animal as a dog.

Foxes are ſometimes domeſticated, but are ſcarcely ever fully tamed.

The hunting of this animal is one of the greateſt diverſions of our country gentlemen. For an account of fox-hunting, ſee HUNTING. The ſkins are valuable for muffs, tippets, &c.

The arctic fox, *C. lagopus*, is well deſcribed by Steller, for whoſe entertaining account of their manners, we muſt refer to Mr Bingley's Animal Biography, vol. i.

75 Zerda, Fennec. Fig. 31.

23. *C. Zerda. Fennec.* This beautiful little animal is about 10 inches long, and of a yellowiſh white colour; its eyes are large and of a bright black; its ears of an uncommon ſize, internally of a bright roſe colour, and edged with a broad margin of white hair, with an orifice ſo ſmall as to be ſcarcely viſible; its legs and feet are ſhaped like thoſe of a dog; its tail long, tapering, and tipped with black.

It inhabits the vaſt deſerts of Saara, that extend beyond Mount Atlas, and is ſaid to be called by the Moors, *zerda*, though Mr Bruce, who ſaw it often, and kept two or three ſpecimens of it, ſays that its proper name is *fennec*. It feeds on inſects, eſpecially locuſts, ſits on its rump, barks like a dog, only with a ſhriller voice, is very vigilant, and ſo ſwift that it is very rarely taken alive.

The following intereſting account of its manners and appearance, is given by Mr Bruce.

" Though his favourite food ſeemed to be dates, or any ſweet fruit, yet I obſerved he was very fond of eggs; and ſmall birds eggs were firſt brought him, which he devoured with great avidity; but he did not ſeem to know how to manage that of a hen; but when broke for him, he ate it with the ſame avidity as the others. When he was hungry he would eat bread, eſpecially with honey or ſugar. It was very obſervable that a bird, whether confined in a cage near him, or flying acroſs the room, engroſſed his whole attention. He followed it with his eyes wherever it went, nor was he, at this time, to be diverted by placing biſcuit before him; and it was obvious, by the great intereſt he ſeemed to take in its motions, that he was accuſtomed to watch for victories over it, either for his pleaſure or his food. He ſeemed very much alarmed at the approach of a cat, and endeavoured to hide himſelf, but ſhewed no ſymptom of preparing for a defence. I never heard he had any voice; he ſuffered himſelf, not without ſome difficulty, to be handled in the day, when he ſeemed rather inclined to ſleep, but was exceedingly unquiet and reſtleſs ſo ſoon as night came, and always endeavouring his eſcape, and though he did not attempt the wire, yet with his ſharp teeth he very ſoon maſtered the wood of any common bird cage. From the ſnout to the anus he was about 10 inches long, his tail five and a quarter, near an inch on the tip of it was black. From the point of his fore ſhoulder to the point of his fore toe, was two inches and ſeven-eighths. He was two inches and a half from his occiput to the point of his noſe; the length of his ears three inches and three-eighths. Theſe were doubled or had a plait on the bottom on the outſide; the border

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* Daniel's Rural Sports, vol. i. p. [illegible]

Feræ. borders of his ears on the inſide were thick covered with ſoft white hair, but the middle part was bare, and of a pink or roſe colour. They were about an inch and a half broad, and the cavities within were very large. It was very difficult to meaſure theſe; for he was very impatient at having his ears touched, and always kept them erect, unleſs when terrified by a cat. The pupil of the eye was large and black, ſurrounded by a deep blue iris. He had ſtrong, thick muſtachoes; the tip of his noſe very ſharp, black, and poliſhed. His upper jaw reached beyond the lower, and had four grinders on each ſide of the mouth. It had ſix fore teeth in each jaw; thoſe in the under jaw are ſmaller than the upper; the canine teeth are long, large, and exceedingly pointed; his legs are ſmall and his feet very broad; he has four toes armed with crooked, black, ſharp claws; thoſe on his fore feet more crooked and ſharp than behind. All his body is nearly of a dirty white, bordering on cream-colour; the hair of his belly rather whiter, ſofter, and longer than the reſt; and on it a number of paps, but he was ſo impatient it was impoſſible to count them. He very ſeldom extended or ſtiffened his tail, the hair of which was harder. He had a very ſly and wily appearance. But as he is a ſolitary animal, and not gregarious, as he has no particular mark of feelings about him, no ſhift or particular cunning which might occaſion Solomon to qualify him as wiſe, as he builds his neſt upon trees, and not on the rock, he cannot be the Saphan (or *coney*) of the ſcripture, as ſome, both Jews and Arabians, not ſufficiently attentive to the qualities attributed to that animal, have nevertheleſs erroneouſly imagined."

77 Felis.

Genus 16. FELIS.

Six front teeth, of which the intermediate are equal; three grinders on each ſide; tongue beſet with reverſed prickles; claws retractile.

In this as in the laſt genus, the individuals would require a particular examination, though they agree more together in their form and habits than thoſe of the dog tribe. We ſhall here, as in the laſt genus, firſt diſcriminate the ſpecies, and then give an account of ſome of the moſt remarkable individuals.

Dr Shaw diſtinguiſhes 25 ſpecies by the following names and characters.

Species 1. *Felis Leo*, Lion. Colour pale, tawny, or dun; tail long and flocky at the tip.—2. *F. Tigris*, Tiger. Tail elongated; body marked with long tranſverſe ſtreaks.—3. *F. Pardus*, Panther. Tail elongated; body yellow, marked with orbicular ſpots above, and lengthened ones below.—4. *F. Leopardus*, Leopard. Body yellow, marked with black ſpots, nearly contiguous, diſpoſed in circles.—5. *F. Jubata*, Hunting Leopard. Colour pale fulvous, with round black ſpots; tail of moderate length; neck ſlightly maned.—6. —*F. Uncia*, Ounce. Tail long; body whitiſh, with irregular black marks.—7. *F. Onca*, Jaguar. Tail of moderate length; body yellowiſh, with black ocellated roundiſh cornered ſpots, with yellow central ſpaces. —8. *F. Pardalis*, Ocelot. Tail longiſh, long ſtripe-ſhaped ſpots on the upper parts, and round ones on the lower.—9. *Cinerea*, Cinereous Cat.—10. *F. Puma*, Puma. Tail long; body reddiſh-brown, whitiſh beneath.—11. *F. Diſcolor*, Black Tiger. Tail long; body black above, whitiſh below.—12. *F. Tigrina*, Margay. Tail long; body fulvous, ſtriped and ſpotted with black, whitiſh beneath.—13. *F. Capenſis*, Cape Cat. Fulvous, with longiſh tail annulated with black; body marked with black ſtripes above, with rounded and lunated black ſpots on the other parts, and a lunated white bar on the ears.—14. *F. Bengalenſis*.—15. *F. Manul*, Manul. Tail elongated, and annulated with black; head marked with ſpots, and two lateral bands of black.—16. *F. Catus*, Common Cat. Yellowiſh gray, with duſky bands, three on the back longitudinal; thoſe on the ſides ſpiral; tail barred with duſky rings.—17. *F. Japanenſis*, Japan Cat.—18. *F. Guigna*, Guigna Cat.—19. *F. Corololo*, Corololo.—20. *F. Serval*, Serval. Tail ſhortiſh; body tawny brown, whitiſh beneath, marked with roundiſh duſky ſpots; orbits of the eyes white.—12. *F. Montana*, Mountain Lynx.—22. *F. Chaus*, Chaus. Tail moderately ſhort, annulated towards the tip, with the tip black; body browniſh yellow; ears brown, bearded with black at the tips.—23. *F. Rufa*, Bay Lynx. Tail ſhort; body bay, obſcurely ſpotted with black; tail white beneath and at the tip; ears bearded at the tip. 24. *F. Caracal*, Caracal. Tail ſhortiſh; body reddiſh-brown; ears black externally, and tipt with long black hairs.—25. *F. Lynx*, Common Lynx. Tail ſhort; body rufous, gray, ſlightly ſpotted with black, white beneath; tail black at the tip; ears terminated by long black hairs.

History of the Species.

78 Lion. Fig. 32.

1. *F. Leo*, The Lion.—The lion has uſually been conſidered as the moſt dignified and majeſtic inhabitant of the foreſt. His vaſt ſize and prodigious ſtrength well entitle him to the rank of lord over moſt other beaſts; though from the obſervations of modern travellers and naturaliſts, we are obliged to conſider him in a light leſs formidable and leſs amiable than that in which he is diſplayed by earlier writers.

This animal ſeldom exceeds eight feet in length from noſe to tail, and the tail itſelf uſually meaſures about four feet; his head is very large; his ears rounded; his face covered with ſhort or cloſe hair, while the upper part of the head, the neck and ſhoulders are coated with long and ſhaggy hair, hanging down below the breaſt and fore part of the belly, like a mane; the hair on the body is ſhort and ſmooth; and the tail is terminated by a blackiſh tuft. The uſual colour of the lion is a pale tawny, inclining to white on the lower part of the body.

The lionneſs is ſmaller than the lion, of a whiter colour beneath, and deſtitute of mane.

The lion is principally found in Africa, and is alſo met with, though by far leſs plentifully, in the hotter parts of Aſia; but it is in the interior of Africa that he exerts his greateſt ravages, and reigns ſuperior among the weaker quadrupeds. His habitation is in the thickeſt parts of the foreſt, and he is ſeldom ſeen by day; but, when night approaches, he quits his retreat, and prowls about for prey. The roaring of this animal when in queſt of prey, is generally ſaid to reſemble the ſound of thunder; and being re-echoed by the rocks and mountains, it appals the whole race of animals. Frequently, however, he varies his voice into a ſort of a ſcream or yell. His ſtrength is ſo great, that it is affirmed a ſingle ſtroke of his paw is ſufficient to break the back of a horſe; and he has been ſeen to carry off

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with apparent eaſe a middle-ſized ox, or even a buffalo. We are told by Kolben, that he uſually knocks down his prey with his paw, and ſeldom bites it till he has given the mortal blow. His teeth are ſo ſtrong, that he breaks the largeſt bones with eaſe, and ſwallows them with the fleſh; and the prickles on his tongue are ſo large and ſtrong, as to be capable of lacerating the ſkin. He uſually conceals himſelf in a thicket, from which he darts upon his prey: and, it is ſaid, that if he chances to miſs his aim, he will not follow his prey any farther; but, as though aſhamed, he turns back to the place from which he ſprung on it, ſlowly, and ſtep by ſtep, as it were, meaſuring the diſtance between the two points, as if to find out how much too ſhort, or how much beyond the mark, he had taken his leap.

Dr Sparrman ſays, that from all the moſt credible accounts he could collect concerning lions, as well as from what he himſelf ſaw, he thinks he may ſafely conclude, that this wild beaſt is frequently a great coward, or, at leaſt, deficient in point of courage comparatively to his ſtrength; on the other hand, however, he ſometimes ſhews an unuſual degree of intrepidity, of which he mentions the following inſtance as it was related to him.

A lion had broken into a walled incloſure for cattle through the latticed gate, and done conſiderable damage. The people belonging to the farm were aſſured of his coming again by the ſame way: in conſequence of which they ſtretched a rope directly acroſs the entrance, to which ſeveral loaded guns were faſtened in ſuch a manner, that they muſt neceſſarily diſcharge themſelves into the lion's body, as ſoon as ever he ſhould puſh againſt the cord, as it was expected he would, with his breaſt. But the lion, who came before it was dark, having probably ſome ſuſpicions reſpecting the cord, ſtruck it away with his foot, and without betraying the leaſt fear, in conſequence of the report made by the loaded pieces, went on ſteadily, and careleſs of every thing, and devoured the prey he had left untouched before.

The lion is ſaid to prefer the fleſh of a Hottentot to that of any other animal; and in order to procure it, will ſometimes depart from his uſual method of quitting his prey when he miſſes his aim. It is ſurpriſing with what obſtinacy he will follow one of theſe unfortunate ſavages. We are informed by Mr Barrow, that one of the Namaaqua Hottentots, endeavouring to drive his maſter's cattle into a pool of water, incloſed between two ridges of rocks, eſpied a huge lion couching in the midſt of the pool. Terrified at the unexpected ſight of ſuch a beaſt, that ſeemed to have its eyes fixed upon him, he inſtantly took to his heels. In doing this he had preſence of mind enough to run through the herd, concluding, that, if the lion ſhould purſue, he would take up with the firſt beaſt that preſented itſelf. In this, however, he was miſtaken. The lion broke through the herd, making directly after the Hottentot, who, on turning round, and perceiving that the monſter had ſingled him out, breathleſs and half dead with fear, ſcrambled up one of the tree-aloes, in the trunk of which a few ſteps had luckily been cut out, to come at ſome birds neſts that the branches contained. At the ſame moment the lion made a ſpring at him, but miſſing his aim, fell upon the ground. In ſurly ſilence he walked round the tree, caſting at times a dreadful look towards the poor Hottentot, who had crept behind the neſts. We ſhould here remark, that theſe neſts belong to a ſmall bird of the genus *Loxia*, that lives in a ſtate of ſociety with the reſt of its ſpecies, conſtructing a whole republic of neſts in one clump, and under one cover. One of theſe clumps of neſts will ſometimes extend a ſpace of 10 feet in diameter, and contain a population of ſeveral hundred individuals. It was under the cover of one of theſe edifices that the Hottentot ſcreened himſelf from the ſight of the lion. Having remained ſilent and motionleſs for a length of time, he ventured to peep over the ſide of the neſt, hoping that the lion had taken his departure; when to his great terror and aſtoniſhment, his eyes met thoſe of the animal, which, as the poor fellow afterwards expreſſed himſelf, flaſhed fire at him. In ſhort, the lion laid himſelf down at the foot of the tree, and did not remove from the place for 24 hours. At the end of this time becoming parched with thirſt, he went to a ſpring at ſome diſtance in order to drink. The Hottentot now, with trepidation, ventured to deſcend, and ſcampered off home, which was not more than a mile diſtant, as faſt as his feet could carry him, where he arrived in ſafety. The perſeverance of the lion was ſuch, that it afterwards appeared, he returned to the tree, and finding the man had deſcended, hunted him by the ſcent to within 300 paces of the houſe *.

Feræ.

An elderly Hottentot obſerved a lion following him at a great diſtance for two hours together. He thence naturally concluded, that the lion only waited the approach of darkneſs, in order to make him his prey; and in the meantime expected nothing elſe than to ſerve for this fierce animal's ſupper, as he had no other weapon of defence than a ſtaff. But as he was well acquainted with the nature of the lion, and the manner of its ſeizing upon its prey, and at the ſame time had leiſure at intervals to ponder on the ways and means in which it was moſt probable that his exiſtence would be put an end to, he at length bethought of a method of ſaving his life. For this end, in place of making his way home, he looked out for a *klipkrans*, or a rocky place level at top, and having a perpendicular precipice on one ſide of it; and ſitting down on the edge of one of theſe precipices, he found, to his great ſatisfaction, that the lion alſo made a halt, and kept the ſame diſtance as before. As ſoon as it grew dark, the Hottentot ſliding a little forwards, let himſelf down below the upper edge of the precipice upon a projecting part of the rock, where he could barely keep himſelf from falling. But in order to deceive the lion ſtill more, he ſet his hat and cloak on the ſtick, making with it at the ſame time a gentle motion juſt over his head, and a little way from the edge of the mountain. This crafty expedient had the deſired effect. He did not remain long in that ſituation, before the lion came creeping ſoftly towards him like a cat, and miſtaking the ſkin cloak for the Hottentot himſelf, took his leap with ſuch exactneſs and preciſion, as to fall headlong down the precipice, directly cloſe to the ſnare which had been placed for him; when the Hottentot is ſaid, in great joy, exultingly to have called out, *t'katſi;* an interjection which is of very extenſive import and ſignification †.

Next to Hottentots fleſh he is ſaid to prefer that of

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* Barrow's Travels in Africa, vol. i.

† Sparrman's Voyage.

Feræ.

horſes and buffaloes, but on the ſheep he ſeldom deigns to fix his paw, perhaps from his woolly covering, which he is too indolent to be at the labour of uncaſing. It is commonly ſaid, that a lion will devour as much at once as will ſerve him for two or three days, and when ſatiated with food, he returns to his den, where he remains in a ſtate of inactivity till hunger again compels him to ſeek for food.

Though this animal has generally been repreſented as extremely brave as well as ferocious, it has not unfrequently happened, that he has been frightened or driven away by the oppoſition of a much inferior enemy. It is ſaid, that a traveller once had an opportunity of ſeeing a female buffalo with her calf, defended by a river at her back, keep at bay for a long time five lions which had partly ſurrounded her, but did not, as long as the traveller looked on, dare to attack her; and we are informed, that Mr Brew, commander of the Senegal company on the African coaſt, had once near him a large full-grown tame lion, about four years old, when a flock of goats paſſed. All the goats except one, ran off with terror at the ſight of the lion, but this one looking ſtedfaſtly at the lion, ſtamped with his foot on the ground in a menacing manner, then retreated three ſteps, and inſtantly returning, ſtruck the lion's forehead ſo violently with his horns, that the animal was ſtunned by the blow, and having repeated this ſeveral times before the lion could recover himſelf, the monſtrous animal was thrown into ſuch confuſion, that he went behind his maſter for protection.

The lion does not always deſtroy the object that he attacks, but ſeems ſometimes to ſpring on an animal through wantonneſs. Dr Sparrman was told of ſeveral who had eſcaped from the paw of lions. At St Catharine Cru's church, Leadenhall-ſtreet, London, proviſion is made, under the will of Sir John Gager, who was lord mayor in the year 1646, for a ſermon to be annually preached, with a charitable donation, on the 16th of November, in commemoration of his happy deliverance from a lion, which he met in a deſert as he was travelling in the Turkiſh dominions, and which ſuffered him to paſs unmoleſted.

There ſeems no doubt, that in thoſe places where mankind have made the greateſt advances towards civilization, the lion has loſt much of his native boldneſs and ferocity. Experience ſeems to have taught him, that in cunning and reſources he is inferior to man, and he therefore ſeldom attacks the human race, except forced to it by the imperious calls of hunger.

The lionneſs is ſaid to breed only once a-year, and to produce four or five at a birth, which ſhe nurſes with great aſſiduity, and attends in their firſt excurſions for plunder. Theſe animals readily breed in captivity.

Buffon, reaſoning from the ſize and conſtitution of the lion, and the time required for his arrival at full growth, concluded, that he ought to live about 25 years; but if we may depend upon the accounts that have been given of ſome lions kept in the Tower of London, the period of his life may be conſiderably extended. One of theſe called Pompey, is ſaid to have lived at leaſt 70 years, and another 63.

The lion has been often brought from his native foreſts into Europe; and, when taken young, is capable of being made very gentle and tractable. Many of our readers will have ſeen the keepers of wild beaſts play tricks with this monſtrous animal, which he appears to bear without ſhewing any marks of anger. He ſeems to bear all with the greateſt compoſure, and we ſeldom hear of his revenging theſe unprovoked ſallies of impertinent curioſity. It is, however, not always ſafe to play with, and ſtill leſs ſo to mingle blows with careſſes, as is done by ſome injudicious keepers.

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Numerous inſtances are on record of the lion's gentleneſs, ſagacity, and gratitude, while in a ſtate of domeſtication. He has been known to ſpare the lives of animals that were thrown to be devoured by him; to live peaceably with them; to afford them part of his food, and even to want food himſelf, rather than deprive them of that life which his generoſity had once ſpared. A dog was put into the cage of a lion in the menagery at the tower, ſome years ago, for food; the ſtately animal, however, ſpared his life, and they lived together for a conſiderable time in the ſame den, in the moſt perfect harmony, and appeared to have a great affection for each other. The dog had ſometimes the impudence to growl at the lion, and even diſpute with him the food which was thrown to them; ſo true is the old proverb, *familiarity breeds contempt:* but the noble animal was never known to chaſtiſe the impertinent conduct of his little companion, but uſually ſuffered him to eat quietly till he was ſatisfied, before he began his own repaſt.

Mr Hope relates an anecdote of a lion in the poſſeſſion of the ducheſs of Hamilton ſome years ago, which affords a ſtriking inſtance both of the retentive memory of this animal, and of his attachment to thoſe who have been kind to him. "One day (ſays Mr Hope) I had the honour of dining with the ducheſs of Hamilton: after dinner the company attended her grace to ſee a lion, that ſhe had in the court, fed. While we were admiring his fierceneſs, and teazing him with ſticks to make him abandon his prey and fly at us, the porter came and informed the ducheſs, that a ſerjeant with ſome recruits at the gate, begged permiſſion to ſee the lion. Her grace, with great condeſcenſion and good nature, aſked permiſſion of the company for the travellers to come in, as they would then have the ſatisfaction of ſeeing the animal fed. They were accordingly admitted at the moment the lion was growling over his prey. The ſerjeant, advancing to the cage, called out, "Nero, Nero, poor Nero, don't you know me?" The animal inſtantly turned his head to look at him, then roſe up, left his prey, and came wagging his tail, to the ſide of the cage. The man then put his hands upon him, and patted him: telling us, at the ſame time, that it was three years ſince they had ſeen each other, but that the care of the lion on his paſſage from Gibraltar, had been committed to him, and he was happy to ſee the poor beaſt ſhow ſo much gratitude for his attention. The lion indeed ſeemed perfectly pleaſed; he went to and fro, rubbing himſelf againſt the place where his benefactor ſtood, and licked the ſerjeant's hand as he held it out to him. The man wanted to go into the cage to him, but was prevented by the company, who were not altogether convinced of the ſafety of the act *."

The lion is frequently hunted at the Cape of Good

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* T [illegible]

Hope, for the ſake of his ſkin and fleſh, which latter is eſteemed by ſome an excellent food, and is often eaten by the negroes. The coloniſts of the Cape hunt him with dogs, and it is ſaid that 12 or 16 are ſufficient to overcome the lion. The lion runs for ſome time after being attacked, then ſtops and faces his enemies, as if in contempt of the dogs, which, as ſoon as they have an opportunity, ruſh all at once upon him, and ſoon overpower him. Three or four of the dogs, however, are commonly killed in the conflict, being ſtruck dead by the ſtroke of his paw.

2. *F. Tigris*, the Tiger.—This moſt beautiful, but moſt dangerous of quadrupeds, is nearly equal in ſize to the lion, and has even been ſeen larger, viz. 15 feet long, from the noſe to the tip of the tail. The prevailing colour of the body is a deep tawny, or orange yellow; the face, throat, and lower part of the belly being nearly white, and the whole is traverſed by numerous long black ſtripes, forming a bold and ſtriking contraſt with the ground colour. Theſe ſtripes are proportionally ſmaller on the face and breaſt, than on the other parts of the body. The tail is ſhorter than the body, and is ſurrounded with black rings. Dr Shaw obſerves, that when ſeen in perfection, and before its health has been impaired by confinement, it is ſcarcely poſſible to conceive a more elegantly variegated animal than the tiger: the bright and intenſe orange yellow which conſtitutes the ground colour; the deep and well-defined ſtripes of black, in ſome parts double, in others ſingle; the pure white of the cheeks and lower parts of the ſides, over which a part of the black ſtriping is continued, form, altogether, an appearance far ſuperior in beauty to the ſkin of the zebra, or that of any other regularly-marked quadruped, not excepting even the panther itſelf.

This animal is confined to the warmer parts of Aſia, and is principally found in the peninſula of India, and the Indian iſlands. The ſpecies extends, however, as far as China and Chineſe Tartary, to the lake Ural and the Altaic mountains.

The tiger is of a diſpoſition ſo fierce and ſanguinary, as to ſurpaſs in rapacity every other wild beaſt; indeed there is no animal that he will not venture to attack. Dreadful combats ſometimes take place between him and the lion, and they are carried on with ſuch fury and obſtinacy, that both parties are often found dead together. He commits horrid ravages among the flocks and herds, and neither the ſight nor oppoſition of man have power to make him deſiſt. It is ſaid that when undiſturbed, he plunges his head into the body of the animal he has ſlaughtered, and greedily ſucks its blood. His ſtrength is aſtoniſhing. We are told that a peaſant in the Eaſt Indies, had a buffalo fallen into a quagmire, and while he went to call for aſſiſtance, an immenſe tiger came, that immediately drew out the animal, on which the united efforts of ſeveral men had no effect. When the people returned, the firſt object they beheld was the tiger, with the buffalo thrown over his ſhoulder, as a gooſe is by a fox: he was carrying him away with his feet upward, towards his den. As ſoon, however, as he ſaw the men, he let fall his prey, and inſtantly fled to the woods; but he had previouſly killed the buffalo, and ſucked its blood. If we conſider that a buffalo is often twice the ſize of our ordinary cattle, we may form ſome idea of the immenſe ſtrength of an animal that could thus run off with a carcaſe as large again as himſelf.

The tiger's method of ſeizing his prey is ſimilar to that of the lion, ruſhing on it at once from his concealment, with a horrid roar. His voice when ſpringing on his victim, is ſaid to be hideous beyond conception. Like the lion, if he miſſes his aim, he makes off without repeating the attack for that time.

The tiger ſeems to prefer the fleſh of man to that of any other prey, as he takes all opportunities of ſeizing a man where he thinks there is any chance of ſucceſs. Many of our readers will perhaps remember to have read an account of the melancholy fate of Mr Monro, who was killed by a tiger in the Eaſt Indies in the year 1792. "We went (ſays the narrator) on ſhore on Sangar iſland, to ſhoot deer, of which we ſaw innumerable tracks, as well as of tigers; notwithſtanding which, we continued our diverſion till near three o'clock, when, ſitting down by the ſide of a jungle to refreſh ourſelves, a roar like thunder was heard, and an immenſe tiger ſeized on our unfortunate friend, and ruſhed again into the jungle, dragging him through the thickeſt buſhes and trees, every thing giving way to his monſtrous ſtrength; a tigreſs accompanied his progreſs. The united agonies of horror, regret, and fear, ruſhed at once upon us. I fired on the tiger; he ſeemed agitated; my companion fired alſo; and in a few moments after this, our unfortunate friend came up to us bathed in blood. Every medical aſſiſtance was vain, and he expired in 24 hours, having received ſuch deep wounds from the teeth and claws of the animal, as rendered his recovery hopeleſs. A large fire, conſiſting of 10 or 12 whole trees, was blazing by us at the time this accident took place, and ten or more of the natives were with us. The human mind can ſcarcely form an idea of this ſcene of horror. We had hardly puſhed our boat from that accurſed ſhore, when the tigreſs made her appearance, almoſt raging mad, and remained on the ſand all the while we continued in ſight.

In the beginning of the laſt century, as Mr Pennant was informed, ſome gentlemen and ladies being on a party of pleaſure, under a ſhade of trees, on the banks of a river in Bengal, obſerved a tiger preparing for its fatal ſpring. One of the ladies, with amazing preſence of mind, laid hold of an umbrella, and furled it full in the animal's face, which inſtantly retired, and gave the company opportunity of removing from ſo terrible a neighbour.

The tigreſs, like the lionneſs, produces four or five young at a litter, and though at all times furious, her rage riſes to the greateſt extremity in defence of her young. If robbed of them, ſhe purſues her plunderers with the greateſt fury and obſtinacy, and they are often obliged to drop ſome of the young tigers, to prevent her from attacking them.

We are told by keepers of *wild beaſts*, that the tiger when full grown, is incapable of being tamed; but it appears that when young, they are gentle, and as playful as a kitten.

The ſkin of this animal is much eſteemed throughout the eaſt, eſpecially in China, where the ſeats of juſtice, on which the mandarins ſit, are covered with it.

80 Panther and Leopard.

3. and 4. *F. Pardus* and *F. Leopardus*, the Panthe

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and the Leopard.—Theſe ſpecies have frequently been confounded, and we mention them together for the ſake of marking their diſtinguiſhing characters. They are uſually diſtinguiſhed by the form of the ſpots; thoſe on the panther having commonly a central ſpot in each circle, while in thoſe of the leopard this is uſually wanting. This diſtinction, however, by no means holds univerſally, and the animals are better diſtinguiſhed by their general ſhade of colour, and by their ſize. The panther is of a darker colour, and larger than the leopard. After all, the diſtinction is by no means ſo ſtrongly marked that we can always diſcriminate between them, and perhaps they ſhould rather be conſidered as varieties of the ſame ſpecies. In manners and diſpoſition they nearly reſemble the tiger, yet the leopard is generally conſidered as leſs fierce than the panther. Both are found in Africa, eſpecially about the river Senegal. It was ſuppoſed that they were to be met with in America, but this appears to be a miſtake.

81 Cat. Fig. 34.

16. *F. Catus*, Common Cat.—This animal is found wild in ſeveral parts of the north of Europe, and is ſo formidable, that it may be called the *European tiger*. It is three or four times as large as the houſe cat; the head larger, and the face flatter. The teeth and claws tremendous; its muſcles very ſtrong, as being formed for rapine; the tail is of a moderate length, but very thick and flat, marked with alternate bars of black and white, the end always black; the hips and hind part of the lower joints of the leg, are always black; the fur is very ſoft and fine. The general colour of theſe animals is of a yellowiſh white, mixed with a deep gray. Theſe colours, though they appear at firſt ſight confuſedly blended together, yet on a cloſe inſpection will be found to be diſpoſed like the ſtreaks on the ſkin of the tiger, pointing from the back downwards, riſing from a black liſt that runs from the head along the middle of the back to the tail.

It is the fierceſt and moſt deſtructive beaſt we have, making dreadful havock among our poultry, lambs, and kids. It inhabits the moſt mountainous and woody parts of theſe iſlands, living moſtly in trees, and feeding only by night. It multiplies as faſt as our common cats; and often the females of the latter will quit their domeſtic mates, and return home pregnant by the former.

Mr Bingley informs us, that at Barnborough, a village between Doncaſter and Barnſby, in Yorkſhire, there is a tradition extant of a ſerious conteſt that once took place between a man and a wild cat. The inhabitants ſay that the fight commenced in an adjacent wood, and that it was continued from thence into the porch of the church. We do not recollect in what manner it is reported to have begun; they, however, tell us, that it ended fatally to both combatants, for each died of the wounds he received. A rude painting in the church commemorates the event; and as in many ſimilar traditions, the accidentally natural red tinge of ſome of the ſtones has been conſtrued into bloody ſtains, which all the properties of ſoap and water have not been able to efface *.

They are taken either in traps, or by ſhooting: in the latter caſe it is very dangerous, only to wound them; for they attack the perſon who injured them, and have ſtrength enough to be no deſpicable enemy. Wild cats were formerly reckoned among the beaſts of chaſe, as appears by a charter of Richard II. to the abbot of Peterborough, giving him leave to hunt the hare, fox, and wild cat; and in much earlier times it was alſo the object of the ſportſman's diverſion.

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The domeſtic cat is ſo well known as to render a deſcription of it unneceſſary. It is an uſeful but generally a deceitful domeſtic; active, neat, ſedate, intent on its prey. When pleaſed, purs and moves its tail. When angry, ſpits, hiſſes, and ſtrikes with its foot. When walking, it draws in its claws; it drinks little; is fond of fiſh; its urine is corroſive; it buries its dung; it waſhes its face with its fore foot (Linnæus ſays at the approach of a ſtorm); the female is remarkably ſalacious; a piteous, ſqualling, jarring lover. Its eyes ſhine in the night; its hair when rubbed in the dark emits electric ſparks; it is even proverbially tenacious of life; always lights on its feet; is fond of perfumes, as *marum*, *cat mint*, *valerian*, &c.

The cat uſually lives from 6 to 10 years. A friend of ours had a cat that lived 18 years.

The female brings forth twice, and ſometimes thrice, a year. The period of her geſtation is fifty-five or fifty-ſix days, and ſhe generally produces 5 or 6 at one litter. She conceals her kittens from the male, leſt he ſhould devour them, as he is ſometimes inclined; and, if apprehenſive of being diſturbed, will take them up in her mouth, and remove them one by one to a more ſecure retreat. Even the female herſelf, contrary to the eſtabliſhed law of nature, which binds the parent to its offspring by an almoſt indiſſoluble tie, is ſometimes known to eat her own young the moment ſhe has produced them.

Inſtances of ſuch conduct in the female cat are, however, very rare, and few mothers exhibit more tenderneſs or greater attachment to their young. The aſſiduity with which ſhe attends them, and the pleaſure ſhe ſeems to take in witneſſing their playful tricks, are extremely amuſing. She has alſo been known, not only to ſuckle kittens belonging to other cats, but even the young of ſuch animals as are generally objects of prey to her kind. A very extraordinary example of this is recorded by Mr White, in his Natural Hiſtory of Selborne, in a cat belonging to a friend of his.

"My friend (ſays Mr White) had a little helpleſs *leveret* brought to him, which the ſervants fed with milk from a ſpoon, and about the ſame time his cat kittened, and the young were diſpatched and buried. The hare was ſoon loſt, and was ſuppoſed, as with moſt foundlings, to have been killed by ſome dog or cat. However, in about a fortnight, as the maſter was ſitting in his garden, in the duſk of the evening, he obſerved his cat, with tail erect, trotting towards him, and calling with little ſhort inward notes of complacency, ſuch as they uſe towards their kittens, and ſomething gamboling after, which proved to be the leveret, that the cat had ſupported with her milk, and continued to ſupport with great affection.—Thus was a granivorous animal nurtured by a carnivorous and predacious one!

"This ſtrange affection was probably occaſioned by that deſiderium, thoſe tender maternal feelings which the loſs of her kittens had awakened in her breaſt; and by the complacency and eaſe ſhe derived to herſelf from the procuring of her teats to be drawn; which were too much diſtended with milk; from habit, ſhe became as much delighted with this foundling as if it had been her own offspring.

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* Bingley's Animal Biography, vol. i. p. 251.

"A boy (ſays the ſame gentleman) had taken three young ſquirrels in their neſt. Theſe ſmall creatures he put under a cat who had lately loſt her kittens, and ſhe nurſes and ſuckles them with the ſame aſſiduity and affection as if they were her own offſpring.

"So many people went to ſee the little ſquirrels ſuckled by a cat, that the foſter-mother became jealous of her charge, and in pain for their ſafety, and therefore hid them over the ceiling, where one died. This circumſtance ſhewed her affection for theſe foundlings, and that ſhe ſuppoſed the ſquirrels to be her own young."

The cat is uſually ſtigmatized as an ungrateful animal, incapable of attachment to her maſter. There are, however, not wanting inſtances that ſhew this character to be overrated. Mr Pennant, in his hiſtory of London, tells us that Henry Wriothſley earl of Southampton, the friend and companion of the earl of Eſſex in his fatal inſurrection, having been ſome time confined in the tower, was one day ſurpriſed by a viſit from his favourite cat, which, ſays tradition, reached its maſter by deſcending the chimney of his apartment.

The following anecdote affords a ſtriking example, both of the ſagacity of this animal, and of its grateful remembrance of thoſe with whom it had been accuſtomed to live. A phyſician of Lyons was, in July 1800, requeſted to inquire into a murder that had been committed on a woman of that city. In conſequence of this requeſt he went to the habitation of the deceaſed, where he found her extended lifeleſs on the floor and weltering in her blood. A large white cat was mounted on the cornice of a cupboard, at the far end of the apartment, where he ſeemed to have taken refuge. He ſat motionleſs, with his eyes fixed on the corpſe, and his attitude and looks expreſſing horror and affright. The following morning he was found in the ſame ſtation and attitude; and when the room was filled with officers of juſtice, neither the clattering of the ſoldiers arms, nor the loud converſation of the company, could in the leaſt degree divert his attention. As ſoon, however, as the ſuſpected perſons were brought in, his eyes glared with increaſed fury, his hair briſtled, he darted into the middle of the apartment, where he gazed for a moment at them, and then retreated precipitately under the bed. The countenances of the aſſaſſins were diſconcerted, and they were now, for the firſt time during the whole courſe of the horrid buſineſs, abandoned by their atrocious audacity.

Our anceſtors ſeem to have had a high ſenſe of the utility of this animal. That excellent prince Howel the good, did not think it beneath him to include that of the cat, and to deſcribe the qualities it ought to have. The price of a kitten before it could ſee, was to be a penny; till it caught a mouſe, 2d; when it commenced mouſer, 4d. It was required beſides, that it ſhould be perfect in its ſenſes of hearing and ſeeing, be a good mouſer, have the claws whole, and be a good nurſe; but if it failed in any of theſe qualities, the ſeller was to forfeit to the buyer the third part of its value. If any one ſtole or killed the cat that guarded the prince's granary, he was to forfeit a milch ewe, its fleece and lamb, or as much wheat as, when poured on the cat ſuſpended by its tail, would form a heap high enough to cover the tip of the former. This is an evidence of the ſimplicity of ancient manners; and it almoſt proves to a demonſtration that cats are not aborigines of theſe iſlands, or known to the earlieſt inhabitants. The large price ſet on them, and the great care taken of the improvement and breed of an animal that multiplies ſo faſt, are almoſt certain proofs of their being little known at that period.

A beautiful variety of the cat, the *Cat of Angora*, is deſcribed in an intereſting manner by M. Sonnini in his Travels in Egypt, vol. i.

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Genus 17. VIVERRA. *Weasels.*

82 Viverra.

Six ſharpiſh cutting teeth; canine teeth longer than the former. Tongue ſmooth in ſome ſpecies, in others furniſhed with reverſed prickles. Body of a lengthened form.

The laſt circumſtance mentioned in the generic character is one of the principal characteriſtics of this tribe, moſt of the ſpecies being remarkable for the length and ſlenderneſs of their form. The viſage is uſually ſharp, the feet ſhort, and the tail in moſt ſpecies long. Many of the ſpecies are notorious for a moſt abominable odour, with which they are capable of annoying their enemies when attacked or diſturbed. If the accounts given of this odious vapour are not aggravated by the abhorrent recollection of thoſe who have experienced its effects, every other ill ſmell which nature can produce, is ſurpaſſed by the overpowering fœtor of theſe extraordinary quadrupeds. In conſequence of this dreadful emanation, the dogs are ſaid to relinquiſh the purſuit, and the men to fly with precipitation from the tainted ſpot; but if unfortunately the leaſt particle of the fluid which the animal commonly diſcharges at this juncture, ſhould happen to light on the clothes of the hunter, he becomes a general nuiſance wherever he appears, and is obliged to diveſt himſelf of his dreſs, and practiſe all the arts of ablution, in order to be reſtored to the ſociety of mankind. They are generally harmleſs animals, live on rabbits, birds, and vermin, and many of them are extremely uſeful in deſtroying rats and mice, and catching rabbits. The ſkins of many of the ſpecies form a valuable article of the fur trade.

There are about 43 ſpecies that have been diſtinguiſhed by ſpecific characters.

1. *V. Ichneumon*, Ichneumon. Gray, with diſtant thumbs, and tail tapering gradually from a thick baſe, and tufted at the end.—2. *V. Cafra*, Caffrarian W. Yellowiſh brown, with tail gradually tapering from a thick baſe, and black at the tip.—3. *V. Zenik*, Zenik. Gray, four-toed, with 10 tranſverſe black bands, and deep cheſnut-coloured tail, black at the tip.—4. *V. Surikatta*, Surikate. Gray brown, with long moveable ſnout, four-toed feet, and ruſty black-tipped tail.—5. *V. Naſua*, Coatimondi. Reddiſh, tail marked with white rings, and a lengthened moveable ſnout.—6. *V. Vulpecula*, Coeſſe. Dark cheſnut, with lengthened ſnout.—7. *V. Striata*, Striated W. Blackiſh, with five parallel white ſtripes on the back. —8. *V. Conepati*, Conepati. Blackiſh, with two white lines on the back extending to the tail.—9. *V. Mephitica*, Mephitic W. or Chinche. Brown, with white

back,

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back, marked with a longitudinal black ſtripe.—10. *V. Chinge*, Chinge. Black, with a changeable caſt of blue, and a row of white ſpots from head to tail. —11. *V. Zorilla*, Zorilla. Variegated black and white.—12. *V. Mapurito*, Mapurito. Black, with white band from the forehead to the middle of the back, and no external ears.—13. *V. Vittata*, Griſon. Blackiſh, with a broad white band from the forehead to each ſhoulder.—14. *V. Quaſje*, Quaſje. Cheſnut, yellowiſh beneath, with lengthened moveable ſnout, and ring-marked tail.—15. *V. Zeylanica*, Ceyloneſe W. Aſh, mixed with gray, whitiſh beneath.—16. *V. Capenſis*, Cape W. Black, with gray back, edged with white.—17. *V. Mellivora*, Honey W. Blackiſh, with a black lateral band; belly black; claws long.—18. *V. Civetta*, Civet. Aſh-coloured, ſpotted with black, with cheſnut-coloured mane, and duſky ſpotted tail. —19. *V. Zibetha*, Zibet. Aſh gray, waved with black and ring-marked tail.—20. *V. Hermaphrodita*, Three-ſtriped W. Dark gray, with long black-tipped tail, and three black ſtripes on the back.—21. *V. Genetta*, Genet. Fulvous gray; body ſpotted with black, and ring-marked tail.—22. *V. Foſſa*, Foſſane. Aſh-coloured, ſpotted with black, and ring-marked tail. —23. *V. Caudivolvula*, Prehenſile W. Yellow, ſhaded with duſky, and prehenſile tail.—24. *V. Faſciata*, Faſciated W. Gray, with ſix longitudinal black bands.—25. *V. Malaccenſis*, Malacca W. Gray, with longitudinal black ſtripes on the neck and rump, and round black ſpots on the ſides. 26. *V. Tigrina*, Tigerine W. Yellowiſh gray, with brown variegations, ring marked black-tipped tail, and a black ſtripe along the back. —27. **V. Foina*, Martin. Blackiſh, fulvous, with white throat.—28. **V. Martes*, Pine Martin. Blackiſh, fulvous, with yellow throat.—29. *V. Zibellina*, Sable. Blackiſh, fulvous, with gray throat.—30. *V. Piſcator*, Fiſher W. Back, belly, feet and tail black; ſides brown, and face ſubcinereous, with black noſe.—31. **V. Putorius*, Pole-cat. Blackiſh, tawny, with whitiſh muzzle and ears.—32. *V. Furo*, Ferret. Yellow, with red eyes.—33. **V. Vulgaris*, Common W. Pale-reddiſh brown, white beneath.—34. **V. Erminia*, Stoat. Tip of the tail black. —35. *V. Galera*, Galera. Entirely brown.—36. *V. Barbara*, Guiana W. Black, with a white trilobate ſpot below the throat.—37. *V. Quadricolor*, White-cheeked W. Yellow, cinereous, with black head, legs, and tail, bright yellow throat, and white cheeks and chin.—38. *V. Canadenſis*, Pezan. Blackiſh fulvous, with white pectoral ſpot.—39. *V. Sarmatia*, Sarmatian W. Variegated above with brown and yellow.—40. *V. Sibirica*, Siberian W. Fulvous, with extremely hairy feet.—41. *V. Touan*, Touan. Ferruginous, white beneath, with the tail naked towards the tip.—42. *Quiqui*, Quiqui. Brown, with wedge-ſhaped ſnout.—43. *V. Cuja*, Cuja. Black, with turned-up ſnout.—The following are enumerated by Dr Shaw, without character, viz. 44. Gray-headed W. —45. South American W.—46. Woody W.—47. Muſky W. and 48. Slender-toed W.

83 Ichneumon. Fig. 35.

1. *V. Ichneumon*, the Ichneumon.—Of this ſpecies there are two diſtinct varieties found in different countries, varying chiefly as to ſize, the larger being commonly about 40 inches from the noſe to the tip of the tail, while the latter ſcarcely exceeds two-thirds of that length. The greater variety has alſo the tail ſlightly tufted at the end. In other reſpects they bear a near reſemblance to each other. They are commonly of a pale reddiſh gray colour, each hair being mottled with brown, ſo as to make the whole body appear ſpeckled. The eyes are of a bright red or flame colour; the ears rounded and almoſt naked; the noſe long and ſlender, and the body rather thicker than in moſt other ſpecies of this genus. The tail is very thick at the baſe, and the hair on the whole animal is hard and coarſe.

The larger ichneumon is found chiefly in Egypt, and in ſome other parts of Africa; the ſmaller ſeems confined to the Eaſt Indies. In their wild ſtate theſe animals frequent the banks of rivers, and, during floods, approach the higheſt grounds and inhabited places in queſt of prey. They are ſaid to ſwim and dive occaſionally, and are able to continue under water for a conſiderable time. The voice of the ichneumon is very ſoft, reſembling a murmur; but it is ſaid never to exert it unleſs ſtruck or irritated. When going to ſleep, it rolls itſelf up like a ball, and is not eaſily awakened.

Both varieties, but eſpecially the Egyptian, are great enemies to ſerpents, rats, and other noxious animals; and the Indian variety attacks with great eagerneſs that dreadful ſnake, the *cobra-di capello*. Hence they are held in great eſteem both by the Egyptians and the natives of India, and are kept like our dogs and cats as domeſtic animals. It is eaſily tamed, is very active, and ſprings with great agility on its prey. It will glide along the ground like a ſerpent, and ſeem as if without feet. It ſits up like a ſquirrel, and eats with its fore feet; catches any thing that is flung to it. It is a great enemy to poultry, and will feign itſelf dead till they come within its reach. It is ſaid to be extremely ſkilful in ſeizing the ſerpents by the throat, in ſuch a manner as to avoid receiving any injury. Lucan has beautifully deſcribed the ſame addreſs of this animal in conquering the Egyptian aſp.

M. d'Obſonville had an ichneumon very young, which he brought up; he fed it at firſt with milk, and afterwards with baked meat, mixed with rice. It ſoon became tamer even than a cat; for it came when called, and followed him, though at liberty, into the country. One day he brought to the animal a ſmall water ſerpent alive, being deſirous to know how far his inſtinct would carry him againſt a being with which he had been hitherto unacquainted. His firſt emotion ſeemed to be aſtoniſhment mixed with anger, for his hair became erect; but an inſtant after, he ſlipped behind the reptile, and with a remarkable ſwiftneſs and agility leaped upon its head, ſeized it, and cruſhed it between his teeth. This eſſay, and new aliment, ſeemed to have awakened in him his innate and deſtructive voracity, which till then had given way to the gentleneſs he had acquired from his education. M. d'Obſonville had about the houſe ſeveral curious kinds of fowls, among which the ichneumon had been brought up, and which before the above adventure he had ſuffered to go and come unmoleſted and unregarded; but in a few days after, when he found himſelf alone, he ſtrangled every one of them, ate a little, and, as appeared, had drunk the blood of two.

The ichneumon is ſaid to be ſhort-lived, but grows very rapidly. They have been brought into our climates; but cannot, without great difficulty, be either reared or preſerved. They appear much incommoded by every weather, and ſoon fall victims to the change of climate.

Civetta. Fig. 36. 26. *V. Civetta*, Civet, or Civet Cat.—This animal is about two feet long from noſe to tail, and the tail meaſures about 14 inches. The ground colour of the body is a yellowiſh grey, marked with large blackiſh or duſky ſpots, diſpoſed in longitudinal rows on each ſide, and ſometimes intermixed with a tinge of ruſty colour. The hair is coarſe, and ſtands up along the top of the back like a ſort of mane; the ears are ſhort and rounded; the eyes of a bright ſky blue; the tip of the noſe, ſides of the face, chin, breaſt, lips, and feet, are black; the remainder of the face and part of the ſides of the neck of a yellowiſh white; and from each ear there are three black ſtripes terminating at the throat and ſhoulders. The tail is generally black, but is ſometimes marked with pale ſpots near its baſe. At a little diſtance below the tail there is a large, double, glandular receptacle, which contains the ſecretion called *civet*, employed as a perfume. See CIVET.

This animal is found in ſeveral parts of Africa and India. It is of a wild diſpoſition, living, like moſt of its kind, on birds and the ſmaller quadrupeds. It is ſaid to be very voracious, and will ſometimes roll itſelf for ſome time on its food before it eats it. It is very deſtructive to poultry, which it ſeizes whenever it can ſteal into a farm yard. It is very prolific, active, and nimble, jumping like a cat, and running very nimbly. Its voice is ſtronger than that of a cat, and ſomewhat reſembles the cry of an enraged dog. It is capable of being tamed, and is uſually kept by perfumers at Amſterdam and ſome other places for the ſake of the *civet*.

Theſe animals, in a ſtate of confinement, are placed, from time to time, in ſtrong wooden cages or receptacles, ſo conſtructed as to prevent the creature from turning round, and biting the perſon employed in collecting the *civet*: this operation is ſaid to be performed twice a week, and is done by ſcraping out the civet with a ſmall ſpoon. The quantity uſually collected at each time amounts to about a dram.

85 Foina. Martin. Fig. 37. 27. *V. Foina*, the Martin.—This is an animal of a very elegant appearance. It is about 18 inches long from noſe to tail, and its tail is about 10 inches. It is of a blackiſh tawny colour, with a white throat, and a duſky brown belly. The tail is buſhy, and darker than the reſt of the body; the ears are pretty large and rounded, and the eyes are very lively.

It is found in moſt parts of Europe, and is not uncommon in Britain. It inhabits woods and fields, and preys on birds and other ſmall animals. It breeds in the hollows of trees, and brings forth from three to five young at a birth.

The martin attacks pheaſants when at rooſt, and makes great havock among them. For this reaſon game-keepers are careful to ſet traps for them, which are baited with a piece of pheaſant or wood-pigeon. Mr Daniel recommends the following mode of catching them, in parks or places that are paled in. As they conſtantly run to the pales and poſts to dry themſelves in the morning, have a groove cut in ſome of the poſts or gate-poſts where they run, ſufficient to contain a ſtrong hawk or rat trap; the trap muſt be ſet in this groove without a bait; in leaping upon the place they are ſure to be taken; a ſmall chain ſhould be fixed to the trap and faſtened to the poſt. The ſkin of the martin affords a valuable fur. Feræ.

86 Zibellina, Sable. 29. *V. Zibellina*, the Sable.—This animal is very ſimilar in its general appearance to the martin, but its fur is finer, and of a deep gloſſy brown; the hair being aſh coloured at the root, and black at the tips. The tail is alſo much ſhorter than in the martin.

It inhabits the northern parts of Aſia, where it lives in holes under ground, eſpecially below the roots of trees. In manners and diſpoſition it greatly reſembles the martin.

The ſkins of ſables form one of the moſt valuable articles of the fur trade; and for theſe the animals are hunted with great eagerneſs.

The hunting is uſually carried on by criminals confined to the deſert regions of Siberia, or by ſoldiers ſent thither for that purpoſe, who generally remain there for ſeveral years. Both are obliged to furniſh a certain quantity of furs. They ſhoot with a ſingle ball, to injure the ſkin as little as poſſible. They frequently take them in traps, or kill them with blunt arrows. As an encouragement to the hunters, they are allowed to ſhare among themſelves whatever ſkins they take above the allotted number; and this, in a few years, amounts to a conſiderable premium.—The hunters form themſelves into ſmall troops, each of which is directed by a leader of their own chooſing.

The ſeaſon of hunting is from November to February; for at that time the ſables are in the higheſt perfection. Thoſe caught at any other time of the year are full of ſhort hairs, and are ſold at inferior prices. The beſt ſkins are ſuch as have only long hair, which is always black, and of a gloſſy brightneſs. Old furs do not retain their gloſs.—Both the Ruſſians and Chineſe have a method of dyeing their furs; but the dyed ſables are eaſily diſcovered, having neither the ſmoothneſs nor the brightneſs of the natural hair.

87 Putorius, Polecat, or Foumart. 29. *V. Putorius*, the Polecat, Fitchet, or Foumart.—The length of this animal is about 17 inches, excluſive of the tail; that of the tail ſix. Its ſhape is long and ſlender; the noſe ſharp-pointed, and the legs ſhort: in fine, admirably formed for inſinuating itſelf into the ſmalleſt holes and paſſages, in ſearch of prey. It is very nimble and active, runs very faſt, will creep up the ſides of walls with great agility, and ſpring with vaſt force. In running, the belly ſeems to touch the ground; in preparing to jump, it arches its back, which aſſiſts it greatly in that action. The ears are ſhort, rounded, and tipt with white; the circumference of the mouth is wholly of a chocolate colour, almoſt black. The ſides are covered with hairs of two colours, the ends of which are of a blackiſh hue, like the other parts; the middle of a full tawny colour.

The toes are long, and ſeparated to the very origin; the tail is covered with pretty long hair.

The polecat is very deſtructive to young game of all kinds, and to poultry: it generally reſides in woods, or thick brakes, burrowing under ground, forming a ſhallow retreat, about two yards in length, which commonly ends, for its ſecurity, among the roots of ſome large trees. It will ſometimes lodge under hay ricks, and

Feræ. and in barns; in the winter it frequents houſes, and makes a common practice of robbing the dairy of the milk. It alſo makes great havock in warrens.

Though the ſmell of the polecat, when alive, is rank and diſagreeable, even to a proverb, yet the ſkin is dreſſed with the hair on, and uſed as other furs for tippets, &c. and is alſo ſent abroad to line clothes.

Mr Bewick mentions an extraordinary method which this animal ſometimes practiſes to procure itſelf ſubſiſtence. During a ſevere ſtorm, one of theſe animals was traced in the ſnow from the ſide of a rivulet to its hole, at ſome diſtance from it. As it was obſerved to have made frequent trips, and as other marks were to be ſeen in the ſnow which could not be eaſily accounted for, it was thought a matter worthy of greater attention. Its hole was accordingly examined, the foumart taken, and 11 fine eels were diſcovered to be the fruits of its nocturnal excurſions. The marks in the ſnow were found to have been made by the motion of the eels in the creature's mouth.

88 *Furo*, Ferret. Fig. 38. 30. *V. Furo*, the Ferret.—This animal is about 14 inches long, and its tail about five. Its noſe is ſharper than that of the polecat; its ears are round, eyes red and fiery, and the colour of its whole body a very pale yellow. It breeds twice in the year, unleſs it devours its offſpring, as it ſometimes does as ſoon as brought forth; it then has three litters. The ferret goes with young ſix weeks, and has generally ſix or ſeven young, which are blind for a month.

It is a native of Africa, and was originally brought into Spain, to free that country from the multitudes of rabbits with which it was overrun.

After two months the young are fit for ſervice in catching rabbits; they ſhould be kept in tubs, or ſmall boxes, where they can be ſupplied with plenty of clean ſtraw, as they are offenſive and ſmell ſtrong; before you uſe, do not feed them, for with their bellies full they will not hunt, but ſleep in the burrows for hours. The ferret is the natural enemy to the rabbit, inſomuch, that if a dead rabbit be laid before a ferret, it inſtantly ſeizes upon it, although it has never ſeen one before; if ſhewn a living rabbit, the ferret is ſtill more eager, faſtens on the neck, winds itſelf round and ſucks the blood until ſatiated. The ferret, however, is apt to loſe its ſavage nature, unleſs the breed is croſſed with the polecat, which the warreners frequently do, and the produce is of a much darker colour, partaking of that of the fire.

89 *Vulgaris*, Weaſel. 31. *V. Vulgaris*, Common Weaſel.—This is one of the ſmalleſt of the tribe; its general length being about ſeven inches, with a tail little more than two inches long. It is uſually of a reddiſh brown on the back, ſides, and legs, white on the throat and belly, and below the corners of the mouth on each jaw is a ſpot of brown. The ears are ſmall and rounded; the mouth furniſhed with whiſkers, and the eyes are black.

The female brings forth in the ſpring, and produces four or five at a birth. Of theſe ſhe is very careful, and, as we are told by Aldrovandus, will carry them about from place to place, when ſhe ſuſpects that they will be ſtolen from her.

The food of this animal is ſimilar to that of the other ſpecies, and it is very deſtructive to young birds, poultry, and rabbits. Its favourite food ſeems to be the field mouſe. It is alſo very fond of eggs. It is exceedingly active, and will run up the ſides of walls with ſuch facility, that ſcarcely any place is ſecure from it; and its body is ſo ſmall, that there are few holes through which it cannot creep. Hiſtory of Species.

It is found in moſt of the temperate parts of Europe, is very common in this iſland, and is alſo occaſionally met with in Barbary. It inhabits the cavities below the roots of trees, and the banks of rivulets, from which it ſallies out in queſt of its prey.

The weaſel was ſuppoſed by Buffon to be untameable; but it appears from a communication made to him by a lady, and publiſhed in his 7th ſupplemental volume, that it may be rendered very gentle and domeſtic. The account is very amuſing, but we have not room for it here. It is given by Dr Shaw, vol. i. p. 521. and Mr Bingley, vol. i. p. 314.

Genus 18. LUTRA. *OTTERS*. 90 Lutra.

Teeth as in the former genus. Feet webbed.

Linnæus formed two genera of the animals which are uſually called weaſels, viz. *viverra* and *muſtela*, in the latter of which he compriſed the otters. Mr Pennant and Dr Shaw have united the muſtelæ to the viverræ, and have made a new genus of the otters, to which Dr Shaw gives the name of *lutra*.

There are eight ſpecies, viz.

1. * *L. Vulgaris*, Common O. Brown, with naked feet, and tail half as long as the body.—2. *L. Lutreola*, Smaller O. Blackiſh tawny, with hairy feet, equal toes, and white muzzle.—3. *L. Marina*, Sea O. Black, with hairy feet, and very ſhort tail.—4. *L. Braſiliana*, Brazilian O. Black, with yellow throat.—5. *L. Saricovienna*, Saricovienne O. Gray, ſpotted with black.—6. *L. Gracilis*, Slender O. Brown, with extremely ſlender body.—7. *L. Viſon*, Viſon O. Body entirely of a deep cheſnut colour.—8. *L. Felina*, Chinchemin O. Of the ſhape and appearance of a cat.

91 *Vulgaris*, Common Otter. Fig. 39. 1. *L. Vulgaris*, Common O.—The uſual length of this animal is about two feet from noſe to tail, and the tail is about 16 inches long. The head and noſe are broad and flat; the eyes are ſmall, but very brilliant, and are placed nearer to each other than in moſt quadrupeds, which gives the otter a ſingular appearance, not unlike an eel. The ears are extremely ſhort; the opening of the mouth ſmall; the lips very muſcular, capable of being brought very cloſe together; and the noſe and corners of the mouth are furniſhed with long whiſkers. The legs are remarkably ſhort, but very muſcular; and the joints are articulated ſo looſely, that the animal can bring its legs on a line with its body, and uſe them as fins for ſwimming. Its fur is of a deep brown colour.

Otters are found in moſt parts of Europe, and are met with occaſionally in Britain. They inhabit the banks of rivers, and their principal food conſiſts of fiſh, though they will ſometimes attack poultry and the ſmaller quadrupeds. They are ſaid to be as deſtructive in a fiſhpond as a polecat is in a henhouſe.

The otter makes its neſt in ſome retired ſpot, where it can have an eaſy and ſecure acceſs to the water, to which it immediately flies on the leaſt alarm; and as it is very active, and ſwims with great rapidity, it is not eaſily taken. This animal is very nice, and will eat no fiſh but ſuch as are perfectly freſh. As ſoon as he catches a fiſh, he drags it on ſhore, and devours it as far as the vent; but unleſs extremely preſſed with hunger, he always leaves the reſt. It ſwims againſt the ſtream in rivers, and may ſometimes be ſeen in concert with a companion hunting the ſalmon. It has been ſuppoſed that the otter never goes out to ſea, but this appears to be a miſtake, for they have been ſeen about the Orkneys, hunting ſea fiſh, eſpecially cod.

When taken young, the otter is eaſily tamed, and may be made to catch fiſh for its maſter's uſe. The uſual way of teaching them is, firſt to make them fetch and carry like a dog, they are then given them a truſs ſtuffed with wool, in the ſhape of a fiſh, which they are accuſtomed to take in their mouths, and drop at command. From this they proceed to real fiſh, which are thrown dead into the water, whence they are taught to fetch it; and thus by degrees they are made to catch living fiſh. Mr Bewick informs us that a man near Wooler had a tame otter, which followed him wherever he went. He frequently carried it to fiſh in the river, and, when ſatiated, it never failed returning to its maſter. One day, in the abſence of his maſter, being taken out by his ſon to fiſh, inſtead of returning as uſual, it refuſed to come at the accuſtomed call, and was loſt. The father tried every means to recover it; and after ſeveral days ſearch, being near the place where his ſon had loſt it, and calling it by its name, to his inexpreſſible joy it came creeping to his feet, and ſhewed many marks of affection and firm attachment. Its food, excluſive of fiſh, conſiſted chiefly of milk and haſty pudding.

Some years ago, one James Campbell, near Inverneſs, had a young otter, which he brought up and tamed. It would follow him wherever he choſe, and if called on by its name, would immediately obey. When apprehenſive of danger from dogs, it ſought the protection of its maſter, and would endeavour to fly into his arms for greater ſecurity. It was frequently employed in catching fiſh, and would ſometimes take eight or ten ſalmons in a day. If not prevented, it always made an attempt to break the fiſh behind the fin next to the tail; and as ſoon as one was taken away, it immediately dived in purſuit of more. When tired, it would refuſe to fiſh any longer, and was then rewarded with as much fiſh as it could devour. Being ſatiſfied with eating, it always curled itſelf round, and fell aſleep, in which ſtate it was carried home. The ſame otter fiſhed as well in the ſea as in the river, and took great numbers of codlings and other fiſh. Its food was generally freſh fiſh, and ſometimes milk. What is ſtill more extraordinary, the otter has been made to hunt fiſh along with dogs, who never gave him the ſmalleſt moleſtation, though accuſtomed to hunt other otters.

The fleſh of the otter is rank and diſagreeable, and partakes ſo much of the nature of fiſh, that by the Roman Catholic religion it is allowed to be eaten on faſt days; and Mr Pennant tells us, that he ſaw in the kitchen of the Carthuſian convent, near Dijon, an otter preparing for the dinner of that religious order, who by their rules are prohibited during their whole lives the eating of fleſh.

The ſea otter is chiefly valuable on account of its fur, which is thick and long, generally of a ſhining black colour, but ſometimes of a ſilvery hue. It is hunted for its furs in Kamtſchatka, and the oppoſite coaſts of America.

Feræ.

92 Urſus.

Genus 19. URSUS. *Bears.*

Six front teeth in both jaws; the two lateral of the lower jaw longer than the reſt, and lobed, with ſmaller or ſecondary teeth at their inner baſes. Canine teeth ſolitary. Grinders five or ſix on each ſide, the firſt very near the canine teeth. Tongue ſmooth. Snout prominent. Eyes furniſhed with a nictitating membrane.

The individuals of this ſpecies have not many circumſtances in common, except thoſe mentioned in the generic character. The ſoles of their feet are long, and extend to the heel, from which circumſtance they tread very firmly. Their claws are long and ſharp, and they are thus enabled to climb trees with great dexterity, either in ſearch of prey, or to eſcape from their enemies. Some of the ſpecies uſe their fore paws as hands.

There are about nine ſpecies, which are thus diſtinguiſhed.

1. *U. Arctos*, Brown Bear. Blackiſh brown, with abrupt tail.—2. *U. Americanus*, American B. Black, with ruſty cheeks and throat.—3. *U. Maritimus*, White or Polar Bear. White, with elongated neck and head, and abrupt tail.—4. *U. Gulo*, Glutton. Reddiſh brown, with tail of the ſame colour, and the middle of the back black.—5. *U. Luſcus*, Wolverine. Ruſty, with duſky ſnout, and forehead and lateral band of the body whitiſh.—6. *U. Lotor*, Racoon. Tail ring-marked, and a black band acroſs the eyes.—7. *U. Meles*, Badger. Tail unmarked; body gray above, black below, and a longitudinal black band through the eyes and head.—8. *U. Labradorius*, American Badger. Pale yellowiſh gray, with the throat and belly white, and head ſtriped with black.—9. *U. Indicus*, Indian Badger. White above, black beneath.

93 Arctos. Common Bear. Fig. 40.

1. *Urſus Arctos*, Common or Brown Bear.—There is a conſiderable variety of colour in different individuals of this ſpecies, according to the climate it inhabits. The prevailing colour is a blackiſh brown, but they are ſometimes ſeen gray, or even quite white. His general appearance is very clumſy; his body thick, legs very ſtrong, head round, neck ſhort, and he is covered with a very long thick fur.

He is a native of almoſt all the northern parts of Europe and Aſia, and is ſaid to be found in ſome of the Indian iſlands, eſpecially Ceylon. He inhabits woods and unfrequented foreſts, where he paſſes the greateſt part of winter in a ſtate of repoſe and abſtinence, coming out only at diſtant intervals, and again concealing himſelf till the approach of ſpring. He lives chiefly on vegetables, ſuch as roots and fruits; but when preſſed by hunger, he becomes fierce and ravenous, and will attack animals of almoſt every deſcription. He is ſaid to be particularly fond of honey, in ſearch of which he climbs trees, in order to get at the neſts of wild bees. He will catch and devour fiſh, and occaſionally frequents the banks of rivers for that purpoſe. It is obſerved that the brown and black varieties differ ſomewhat in their choice of food, the former living almoſt entirely on vegetables, while the latter frequently attack cattle, lambs, and kids, the blood of which they ſuck, like many of the cat and weaſel tribe.

Fig.

The females bring forth two young at a birth. It was formerly ſuppoſed that the cubs were nearly ſhapeleſs maſſes, that were gradually licked and faſhioned into ſhape by the parent, whence the expreſſion of an unlicked cub, for an awkward ill mannered booby. This has long been proved to be a vulgar error. Though not ſhapeleſs, the cubs are, however, uſually blind for about a month. The bear is an animal that is extremely uſeful to the inhabitants of the north of Europe; his fleſh is nearly as good as pork, and makes excellent bacon. His ſkin is uſed for muffs, tippets, and other articles of dreſs, and the fat is held in great eſtimation by the inhabitants of Kamtſchatka as a very ſavoury and wholeſome nouriſhment.

When tamed, it appears mild and obedient to its maſter, but is not to be truſted without the utmoſt caution.—It may be taught to walk upright, to dance, to lay hold of a pole with its paws, and perform various tricks to entertain the multitude, who are highly pleaſed to ſee the awkward meaſures of this rugged creature, which it ſeems to ſuit to the ſound of an inſtrument, or to the voice of its leader. But to give the bear this kind of education, it muſt be taken when young, and early accuſtomed to reſtraint and diſcipline. An old bear will ſuffer neither, without diſcovering the moſt furious reſentment; neither the voice nor menace of his keeper has any effect upon him; he equally growls at the hand that is held out to feed, as at that which is raiſed to correct him.

The exceſſive cruelties practiſed upon this poor animal, in teaching it to walk erect, and regulate its motions to the ſound of the flageolet, are ſuch as make ſenſibility ſhudder. Its eyes are put out, and an iron ring being put through the cartilage of the noſe, to lead it by, it is kept from food, and beaten, till it yield obedience to the will of its ſavage leaders. Some of them are taught to perform by ſetting their feet upon hot iron plates, and then playing to them whilſt in this uneaſy ſituation. It is truly ſhocking to every feeling mind to reflect, that ſuch cruelties ſhould be exerciſed upon any part of the brute creation by our fellow men. That they ſhould be rewarded by numbers of unthinking people, who crowd around them to ſee the animal's rude attempts to imitate human actions, is not to be wondered at; but it is much to be wiſhed, that the timely interference of the magiſtrate would prevent every exhibition of this kind, that in Britain at leaſt, we might not be reproached with tolerating practices ſo diſgraceful to humanity.

One of theſe animals, preſented to the prince of Wales a few years ago, was kept in the tower. By the careleſſneſs of the ſervant, the door of his den was left open, and the keeper's wife happening to go acroſs the court at the ſame time, the animal flew out, ſeized the woman, threw her down, and faſtened upon her neck, which he bit, and without offering any farther violence, lay upon her, ſucking the blood out of the wound. Reſiſtance was in vain, as it only ſerved to irritate the brute, and ſhe muſt inevitably have periſhed, had not her huſband luckily diſcovered her ſituation. By a ſudden blow he obliged the bear to quit his hold, and retire to his den, which he did with great reluctance, and not without making a ſecond attempt to come at the woman, who was almoſt dead through fear and loſs of blood. It is ſomewhat remarkable, that wherever it happened to ſee her afterwards, it always growled, and made moſt violent ſtruggles to get out to her. The prince, upon hearing of the circumſtance, ordered the bear to be killed.

[illegible] Species.

A few years ago, a man exhibited at Edinburgh a bear, which it was diſcovered he chiefly fed with dead bodies taken from the burying-grounds. On complaint being made to the magiſtrates, they ordered the bear to be ſhot. What puniſhment was inflicted on the man we do not recollect.

or maritime, Polar Bear. Fig. [illegible]

3. *U. Maritimus*, the White or Polar Bear.—This ſpecies is conſiderably larger and longer than the common bear, having been ſometimes found 12 feet in length. It is exceedingly ſtrong and fierce, and its body is covered with a very long, thick, white fur. It inhabits the coldeſt regions of the north, and is ſometimes carried on floating ice as far to the ſouthward as Newfoundland. In winter it buries itſelf in the ſnow, where it lies in a torpid ſtate; but in ſummer it takes up its reſidence in the cliffs and caverns of the numerous ice iſlands that are found in thoſe high latitudes. Here it brings forth its young, uſually one or two at a birth. The parent is exceedingly tender and and affectionate to her young, of which the following anecdote affords a ſtriking and intereſting example.

While the Carcaſe frigate, which went out ſome years ago to make diſcoveries towards the north pole, was locked in the ice, early one morning the man at the maſt-head gave notice that three bears were making their way very faſt over the frozen ocean, and were directing their courſe towards the ſhip. They had, no doubt, being invited by the ſcent of ſome blubber of a ſea-horſe that the crew had killed a few days before, which had been ſet on fire, and drew out of the flames a part of the fleſh of the ſea-horſe that remained unconſumed, and ate it voraciouſly. The crew from the ſhip threw great lumps of the fleſh of the ſea-horſe, which they had ſtill left upon the ice, which the old bear fetched ſingly, laid every lump before her cubs as ſhe brought it, and dividing it, gave to each a ſhare, reſerving but a ſmall portion to herſelf. As ſhe was fetching away the laſt piece, they levelled their muſkets at the cubs, and ſhot them both dead, and in her retreat they wounded the dam, but not mortally. It would have drawn tears of pity from any but unfeeling minds, to have marked the affectionate concern expreſſed by this poor beaſt in the dying moments of her expiring young. Though ſhe was herſelf dreadfully wounded, and could but juſt crawl to the place where they lay, ſhe carried the lump of fleſh ſhe had fetched away, as ſhe had done others before; tore it in pieces, and laid it before them; and when ſhe ſaw that they refuſed to eat, ſhe laid her paws firſt upon one, and then upon the other, and endeavoured to raiſe them up: all this while it was pitiful to hear her moan. When ſhe found ſhe could not ſtir them, ſhe went off, and when ſhe had got at ſome diſtance, looked back and moaned; and that not availing her to entice them away, ſhe returned, and ſmelling round them, began to lick their wounds. She went off a ſecond time as before, and having crawled a few paces, looked again behind her, and for ſome time ſtood moaning. But ſtill, her cubs not riſing to follow her, ſhe returned to them again, and with ſigns of inexpreſſible fondneſs went round one, and round the other, pawing them, and moaning. Finding at laſt that they were cold and lifeleſs, ſhe raiſed her head towards the ſhip, and uttered a growl of deſpair, which the murderers returned with a volley of muſket balls. She fell between her cubs, and died licking their wounds.

The polar bear lives chiefly on fiſh, but ſometimes attacks the ſeals. He in his turn becomes a prey to the inhabitants of the arctic regions, who eat the fleſh, though it is very coarſe, and uſe the ſkin for coverings of various kinds.

5. *U. Luſcus.* Wolverine.—This, by moſt naturaliſts, is conſidered only as a variety of the glutton. It is a large animal, almoſt equalling the wolf in ſize. It is pretty common in the northern parts of North America, where it burrows under ground. It is a beaſt of prey, living on deer and ſimilar animals. Though its pace is very ſlow, it has a very acute ſcent, is extremely ſtrong, and poſſeſſed of great ſagacity. It is ſaid to be ſo fierce as to be a terror even to the wolves and bears; and its ſtrength is ſo great, that it has been known to pull down a pile of immenſe logs of wood, in order to get at ſome proviſiens that had been hidden there, though ſome of the logs were as much as two men could carry. It is a great enemy to badgers and foxes.

It is hunted in North America for the ſake of its ſkin.

7. *U. Meles,* The Badger.—This is an animal of a very clumſy make, being thick-necked and thick-bodied, with very ſhort legs. His uſual length from noſe to tail is about two feet and a half, and the tail itſelf ſeldom exceeds ſix inches. His eyes are very ſmall, ears ſhort and rounded. The body is covered with long coarſe hairs like briſtles, that are of a dirty yellowiſh white next the root, black in the middle, and gray at the tips. The badger differs from moſt other animals in having his back of a lighter colour than his belly. He is exceedingly ſtrong, eſpecially about the legs and feet, which are formed for burrowing in the earth.

This animal is found in all the temperate parts of Europe and of Aſia. It makes its habitation below ground, and is a very cleanly animal, ſo that when his retreat is defiled by any other animal, as the fox, he quits it for another. It ſeldom leaves its hole during the day, feeding only by night. Its principal food appears to conſiſt of the ſmaller quadrupeds, as rabbits, birds, &c. though Mr Pennant will ſcarcely allow it to be a carnivorous animal. It is alſo ſaid to be very fond of honey. It ſleeps much during winter, confining itſelf like the bear, in a half torpid ſtate.

The female brings forth three or four young, in the early part of ſummer.

Badgers were formerly diſtinguiſhed into ſow badgers and dog badgers, from the ſuppoſed reſemblance of their heads to thoſe animals, though we do not know of any with a head like that of ſwine, its uſual appearance being that of the dog.

No animal has ſuffered more from vulgar prejudices than the badger: harmleſs in his nature, he ſeems to have had the character of ferocity given him, merely becauſe he is an animal of great ſtrength, and is furniſhed with ſtrong teeth, as if formed to live by rapine; he is, however, found to be an animal perfectly inoffenſive. Nature has denied the badger the ſpeed requiſite to eſcape its enemies, but has ſupplied it with ſuch weapons of offence that ſcarcely any creature will attack; few animals defend themſelves better, or bite harder, when purſued; it ſoon comes to bay, and fights with great obſtinacy; the badger is very tenacious of life, yet a ſmall blow on the ſnout is mortal both to him and the otter. It is hunted with terriers, and its obſtinate defence affords great diverſion to thoſe human brutes who are capable of finding pleaſure in the torments of a harmleſs, inoffenſive creature. Ferae.

Its ſkin is uſed for piſtol furniture, when dreſſed with the hair on; the hairs are made into bruſhes that are uſed by painters to ſoften their ſhades, and the fleſh is ſaid to make excellent bacon.

Genus 20. DIDELPHIS *Opossums.* 97 Didelphis.

Front teeth ſmall and rounded; ſuperior 10, the two middle ones longer; inferior eight, the two middle ones broader and very ſhort; canine teeth long; grinders denticulated; tongue ciliated with papillæ; abdominal pouch (in moſt ſpecies) containing the teats.

This curious tribe of animals firſt became known to naturaliſts on the diſcovery of America, where only, moſt of the ſpecies are met with. They are principally diſtinguiſhed by the extraordinary contrivance which nature has adopted for enabling moſt of the genus to ſecure their young, and which conſiſts of a pouch or bag formed by a fold of the ſkin of the belly. Into this the young are received ſoon after birth, and are there ſuckled at teats within the bag, till they are able to ſhift for themſelves. In ſome of theſe there are two or three diſtinct cavities that can be opened or ſhut at pleaſure, by means of bones with which they are provided for that purpoſe. Some of the ſpecies carry their young on their backs, covering them with their tail.

This is a numerous genus, comprehending about 19 ſpecies.

1. *D. Virginiana,* Virginian O. Yellowiſh gray, with naked tail, and black, naked, rounded ears, edged with white.—2. *D. Marſupialis,* Molucca O. Brown, with naked tail.—3. *D. Cayopollin,* Mexican O. Brown, with tail longer than the body, and the eyes ſurrounded with a blackiſh border.—4. *D. Brachyura,* Short-tailed O. With hairy tail; very ſhort, naked ears, reddiſh body, and no pouch.—5. *D. Brunii,* Javan O. Short naked tail, and long three-toed hind feet.—6. *D. Orientalis,* Phalanger. Ruſty white beneath, with blackiſh dorſal line; tail of the length of the body, and hairy almoſt to the middle, and the two middle toes of the hind feet united.—7. *D. Cancrivora,* Cayenne O. Nearly naked; ſcaly tail almoſt the length of the body, and the nail of the thumbs flat.—8. *D. Philander,* Philander. The tail hairy at the baſe, and with four teats in the abdominal pouch.—9. *D. Murina,* Murine O. Tail half-naked, and ſix teats.—10. *D. Dorſigera,* Merian O. Tail naked, hairy at the baſe, and the fore feet without claws.—11. *D. Lemurina,* Lemurine O. Aſh-coloured, tawny beneath, with cylindric, black, furry, prehenſile tail.—12. *D. Obeſula,* Porcupine O. Subferruginous, whitiſh beneath, with longiſh tail; the fore feet five-toed, with ſmall exterior claws; the hind feet four-toed, with two interior toes united.—13 *D. Petaurus,* Petaurine O. Blackiſh-gray, tinged with ferruginous; whitiſh

beneath, with lateral flying membrane, and long, ſubcylindric, very villoſe tail.—15. *D. Sciurea*, Squirrel O. Pale gray, ſnow-white beneath, with lateral flying membrane, and very villoſe prehenſile tail.—15. *D. Macroura*, Long tailed O. Aſh-coloured, whitiſh beneath, with lateral flying membrane, and very long black tail.—16. *D. Pygmaea*, Pygmy O. With lateral flying membrane, and flatly pinnated linear tail.—17. *D. Vulpina*, Vulpine O. Ferruginous, with black villous tail.—18. *D. Auſtralaſiaticus*, New Holland O.—19. *D. Urſina*, Urſine O. Yellowiſh, with cleft upper lip.

1. *D. Virginiana*, Virginian Opoſſum.—This animal is about the ſize of a cat, but appears of a thicker form, from the length and erect poſition of the hair. It has an inelegant aſpect, having a long ſharp face, and very wide mouth, armed with numerous ſharp teeth. The legs are ſhort, and all the toes, except the thumbs of the hind feet, are furniſhed with ſharp claws. The tail is ſtrongly prehenſile, enabling the animal to ſuſpend itſelf thereby.

This is one of thoſe ſpecies in which the abdominal pouch is moſt ſtrongly marked, and into this receptacle the female receives her young when they are in danger, or when fatigued.

The Virginian opoſſum, like all the other American ſpecies, is a carnivorous animal, and preys on poultry, ſmall birds, &c. in the manner of the European polecat; it is alſo frugivorous, eating ſeveral kinds of fruits, roots, &c. It is of a gentle diſpoſition, and may eaſily be tamed; but, like ſome other ſpecies, it has a diſagreeable ſmell. Its voice is a ſort of grunting ſqueak; its pace in running is not ſwift, but it is very expert in climbing trees, and readily paſſes, by means of its clinging tail, from bough to bough, in the manner of a monkey. The female produces four or five at a birth, and has the power of cloſing the pouch ſo ſtrongly as to make it extremely difficult to open it by the hand, nor will any torture compel the animal to looſen it. The female, when ready to bring forth her young, is ſaid to make herſelf a neſt of dry graſs, in ſome buſh near the root of a tree.

10. *D. Dorſigera*, Merian O.—Almoſt the only account we have of this animal is given by Madame Merian, in her work on the inſects of Surinam. Her account is as follows. "By way of filling up a plate, I have repreſented a kind of wood-rat, which always carries her young ones upon her back; ſhe is of a yellowiſh brown colour, and white beneath. When theſe rats come out of their hole, either to play or to ſeek their food, they run about with their mother; but when they are ſatisfied with food, or are apprehenſive of danger, they climb up again on the back of the mother, and twiſt their tails round that of the parent, who runs with them into her hole again."

Genus 21. DASYURUS.

The organs of generation and abdominal pouch in the female, as in the laſt genus. Front teeth in the upper jaw eight, in the lower ſix. Canine teeth, two in each jaw. Grinders 14, of which ſix are ſharp. Head conical; ſnout furniſhed with large whiſkers. Tail furniſhed with long hair. Five toes on each foot, all ſeparate; the thumb of the hind feet extremely ſhort.

This is a new genus, formed by Geoffroy, to comprehend ſeveral ſpecies which are placed by Dr Shaw under *Viverra* and *Didelphis*, but which Geoffroy [illegible] have ſufficiently diſtinguiſhing characters to be ſeparated from both. They are all found in New Holland, and are herbivorous animals.

Geoffroy enumerates ſix ſpecies, to which he gives the following names and characters.

1. *D. Macrourus*, Long-tailed D. Cheſnut colour ſpotted with white. Tail equally ſpeckled.—2. *D. Maugei*, Maugei D. Olive-coloured, ſpotted with white; tail without ſpots.—3. *D. Viverrinus*, Viverrine D. Black, ſpotted with white; tail without ſpots.—4. *D. Tafa*, Tafa D. Entirely brown, tail of the ſame colour.—5. *D. Penicillatus*, Bruſh-tailed D. Aſh-coloured, without ſpots.—6. *D. Minimus*, Leaſt D. Entirely red; tail of the ſame colour.

M. Geoffroy has alſo formed a new genus, which he calls Perameles, in which he includes the *didelphis obeſula* of Shaw, and another ſpecies that had not before been deſcribed. As we are not very certain of the neceſſity of this new genus, we have not included it in the arrangement of the generic characters; and for a deſcription of the genus, we muſt refer to Geoffroy's Memoir, in the fourth volume of *Annales de Muſeum National*, page 56.

Geoffroy calls the ſpecies Perameles *naſuta*, and P. *obeſula*. The latter has been thus deſcribed by Dr Shaw. It is about the ſize of a half-grown domeſtic rat, and is remarkable for a thicker or more corpulent habit than moſt others of the genus. The hind legs are conſiderably longer than the fore legs, and have in miniature the form of thoſe of the kanguroo, and ſome other Auſtralaſian quadrupeds; though the middle claws are far leſs in proportion; the interior ones are double, or both covered by a common ſkin. The colour of this ſpecies is a pale yellow brown, paler and inclining to whitiſh below; and its hair is of a coarſer or harſher appearance than in the reſt of the ſmall opoſſums; the ears are rounded, the tail rather long. When viewed in a curſory manner, the animal bears a diſtant reſemblance to a pig in miniature.

In Collins's account of New South Wales, there is deſcribed a very curious animal under the name of *wombat*, which ſeems nearly allied to the opoſſums, and the other animals which we have juſt mentioned. The teeth, however, differ ſo much from thoſe of the three laſt genera, that it can ſcarcely be ranked as a ſpecies of any of them, and perhaps it may hereafter conſtitute a new genus. The account given in the work referred to is as follows.

Its length, from the tip of the tail to the tip of the noſe, is two feet ſeven inches, of which its body takes up one foot eleven inches. The head is ſeven inches, and the tail five-tenths of an inch. Its circumference behind the fore legs, 27 inches; acroſs the thickeſt part of the belly, 31 inches. Its weight by hand is between 25 and 30 pounds. The hair is coarſe, and is about one inch, or one and five-tenths in length, thinly ſet upon the belly, thicker on the back and head, and thickeſt upon the loins and rump; the colour of it a light ſandy brown, of varying ſhades, but darkeſt along the back.

The head is large and flattiſh, and, when looking the animal full in the face, ſeems, excluding the ears, Face.

to form nearly an equilateral triangle, any ſide of which is about ſeven inches and five-tenths in length; but the upper ſide, or that which conſtitutes the breadth of the head, is rather the ſhorteſt. The hair upon the face lies in regular order, as if it were combed, but its ends pointed upwards in a kind of radii, from the noſe their centre.

The ears are ſharp and erect, of two inches and three-tenths in length, ſtand well aſunder, and are in nowiſe diſproportionate. The eyes are ſmall, and rather ſunk than prominent, but quick and lively. They are placed about two inches and five-tenths aſunder, a little below the centre of the imaginary triangle towards the noſe. The nice co-adaptation of their ciliary proceſſes, which are covered with a fine hair, ſeems to afford the animal an extraordinary power of excluding whatever might be hurtful.

The noſe is large or ſpreading, the noſtrils large, long, and capable of being cloſed. They ſtand angularly with each other, and a channel is continued from them towards the upper lip, which is divided like the hare's. The whiſkers are rather thick and ſtrong, and are in length from two to three inches and a half.

The opening of its mouth is ſmall; it contains five long graſs-cutting teeth in the front of each jaw, like thoſe of the kanguroo; within them is a vacancy for an inch or more, then appear two ſmall canine teeth of equal height with, and ſo much ſimilar to, eight molares ſituated behind, as ſcarcely to be diſtinguiſhable from them. The whole number in both jaws amounts to 24.

The neck is thick and ſhort, and greatly reſtrains the motions of the head, which, according to the common expreſſion, looks as if it were ſtuck upon the ſhoulders.

From the neck the back arches a little as far as the loins, whence it goes off at a flat ſlope to the hindermoſt parts, where not any tail is viſible. A tail, however, may be found by carefully preſſing the finger over the flat ſlope in a line with the back bone. After ſeparating the hairs, it is ſeen of ſome half an inch in length, and from three-tenths to one-tenth of an inch in diameter, naked, except a few fine ſhort hairs near its end. This curious tail ſeemed to hold a much bolder proportion in the young than in the full grown animal.

The fore legs are very ſtrong and muſcular: their length, to the ſole of the paw, is five inches and a half, and the diſtance between them is five inches and a half. The paws are fleſhy, round, and large, being one inch and nine tenths in diameter. Their claws are five in number, attached to as many ſhort digitations. The three middle claws are ſtrong, and about nine-tenths of an inch in length; the thumb and little finger claws are alſo ſtrong, but ſhorter than the others, being only ſeven-tenths of an inch long. The fleſhy root of the thumb claw is ſtronger and more flexible than the others. The ſole of the paw is hard, and the upper part is covered with the common hair, down to the roots of the claws which it overhangs. The hind legs are leſs ſtrong and muſcular than the fore; their length, to the ſole, is five inches and a half; the diſtance between, about ſeven inches and a half. The hind paw is longer than the fore, but not leſs fleſhy; its length is two inches and ſeven-tenths, in breadth two inches and three-fifths. The claws are four in number; the three inner ones are leſs ſtrong, but about one-fifth of an inch longer than the longeſt of the fore claws, and there is a fleſhy ſpur in the place of the thumb claw. The whole paw has a curve, which throws its fore part rather inward.

History of the ſpecies.

In ſize the two ſexes are nearly the ſame, but the female is perhaps rather the heavieſt.

In the opinion of Mr Baſs, this wombat ſeemed to be very economically made; but he thought it unneceſſary to give an account of its internal ſtructure in his journal.

This animal has no claim to ſwiftneſs, as moſt men could run it down. Its pace is hobbling, like the awkward gait of a bear. It is mild and gentle as becomes a graſs-eater; but it bites hard, and is furious when provoked. Mr Baſs never heard its voice but then; it was a low cry, between a hiſſing and a whizzing which could not be heard at a diſtance of above 40 yards. He chaſed one, and ſuddenly lifted it off the ground with his hands, and laid him along his arm like a child. It made no noiſe, nor any effort to eſcape. Its countenance was placid, and ſeemed as content as if Mr Baſs had nurſed it from its infancy. He carried it more than a mile, on his arm or his ſhoulder, which it took in good part; but when he ſecured his legs, in order to go into a buſh to cut a ſpecimen of new wood, its anger roſe, and it ſnapped a piece from the elbow of Mr Baſs's jacket with his graſs-cutting teeth. Here their friendſhip ended, and the creature remained implacable all the way to the boat, and kicked till he was exhauſted.

This circumſtance ſeemed to prove, that with kind treatment the wombat might ſoon be rendered docile and affectionate; but let his tutor beware of giving him provocation, at leaſt if he ſhould be full grown.

Beſides Furneaux iſland, the wombat inhabits the mountains to the weſt of Port Jackſon. It lives below ground, being admirably formed for burrowing; but to what depths it deſcends, does not ſeem to be aſcertained. According to the account given of it by the natives, the wombat of the mountains is never ſeen during the day, but lives retired in his hole, feeding only in the night; but that of the iſlands ſeems to feed in all parts of the day. His food is not well known, but it is probably varied according to the ſituation in which he may be placed. The ſtomachs of ſuch as Mr Baſs examined were diſtended by the coarſe wiry graſs; and he, as well as others, had ſeen the animal ſcratching among the dry ricks of ſea-weed thrown upon the ſhores, though he could never diſcover what the animal was in ſearch of.

174 Macropus.

Genus 22. MACROPUS. *KANGUROO.*

Front teeth in the upper jaw ſix, emarginated; in the lower jaw two, very large, long, ſharp, and pointing forwards; grinders five on each ſide, both in the upper and lower jaw, diſtant from the other teeth; fore legs very ſhort; hind legs very long; abdominal pouch in the female.

There are only two ſpecies at preſent known, viz.

1. *M. Major*, Great K. Browniſh, with ſharpiſh ears, and

Feræ.

and five-toed fore feet.—2. *M. Minor*, Rat K, or kanguroo rat. Brown, aſh coloured below, with rounded ears, and four-toed fore feet.

Theſe were ranked by Linneus under the genus Didelphis, but differ ſo much in many circumſtances, that they have been very properly formed into a ſeparate genus.

105 Major. Kanguroo. Fig. 47.

1. *M. Major*, Great K.—This animal was firſt diſcovered by Captain Cook's people, while at Botany Bay in New Holland, in 1770, and an intereſting, though not ſtrictly accurate account of it, is given in Captain Cook's firſt voyage. It is thus deſcribed by Shaw. The general ſize of the kanguroo is, at leaſt, equal to that of a full grown ſheep; the upper parts of the animal are ſmall, while the lower are remarkably large in proportion; yet ſuch is the elegance of gradation in this reſpect, that the kanguroo may juſtly be conſidered as one of the moſt picturesque of quadrupeds. The head bears ſome reſemblance to that of a deer, and the viſage is mild and placid; the ears are moderately large, of a ſlightly ſharpened form, and upright; the eyes large, and the mouth rather ſmall; the neck thin and finely proportioned, the fore legs extremely ſhort, with the feet divided into five toes, each furniſhed with a ſharp and ſomewhat crooked claw. From the breaſt downwards the body gradually enlarges, and again decreaſes a little towards the tail; the thighs and hind legs are extremely ſtout and long, and the feet are ſo conſtructed as to appear, at firſt ſight, to conſiſt but of three toes, of which the middle is by far the largeſt, and is furniſhed with a claw of great ſize and ſtrength; the exterior toe is alſo furniſhed with a very ſtrong claw, but far ſmaller than that of the middle one; and the interior conſiſts of two very ſmall toes united under a common ſkin, with their reſpective claws placed ſo cloſe to each other as to appear like a ſplit or double claw; the whole appearance of the foot bears a diſtant reſemblance to that of a bird. The kanguroo reſts on the whole length of the foot, which is callous, blackiſh, and granulated beneath. The colour of the animal is an elegant pale brown, lighter or more inclining to whiteneſs on the abdomen; the ventral pouch, or receptacle for the young, is ſituated in the ſame manner as in the opoſſums, and is extremely large and deep.

The dimenſions of a full grown kanguroo are given as follows, in Governor Phillip's Voyage to Botany Bay, viz. eight feet from the tip of the noſe to that of the tail: length of the tail three feet and an inch; of the head eleven inches; of the fore legs two feet; of the hind, three feet ſeven inches: circumference of the fore part of the animal near the legs, three feet nine inches; of the lower part near the legs, four feet five inches; round the thickeſt end of the tail 13 inches. The weight of the largeſt ſpecimens is ſaid to have been about 150 pounds; but it is imagined that this animal attains a much larger ſize.

Though the general poſition of the kanguroo, when at reſt, is ſtanding on its hind feet, yet it frequently places its fore feet on the ground alſo, and thus feeds in the manner of other quadrupeds. It drinks by lapping. In its natural ſtate it is extremely timid, and ſprings from the ſight of mankind by vaſt bounds of many feet in height, and to a ſurpriſing diſtance. When in a ſtate of captivity, it has ſometimes a way of ſpringing forwards and kicking with its hind feet in a very forcible and violent manner; during which action it reſts or props itſelf on the baſe of the tail. In a natural ſtate it ſometimes uſes its tail as a weapon of defence, and will give ſuch ſevere blows with it to dogs as to oblige them to deſiſt from their attack. The female kanguroo has two mammæ ſituated in the abdominal pouch, and in each are ſeated two teats; yet ſo far as has hitherto been obſerved, the animal produces but one young at a birth; and ſo exceedingly diminutive is the young, when firſt found in the pouch, as ſcarcely to exceed an inch in length. The young continues in the pouch till it is grown to a large ſize, and takes occaſional refuge in it long after it has been accuſtomed to come abroad.

[illegible]

The kanguroo feeds entirely on vegetable ſubſtances, and chiefly on graſs. In their native ſtate theſe animals are ſaid to feed in herds of 30 or 40 together, and one is generally obſerved to be ſtationed, as if apparently on the watch, at a diſtance from the reſt.

The fleſh of the kanguroo is ſaid to be rather coarſe; and ſuch as to be eaten rather in defect of other food than as an article of luxury.

Genus 23. Talpa. *Moles.*

106 Talpa.

Front teeth in the upper jaw ſix, unequal; in the lower eight. Canine teeth one on each ſide, the upper larger. Grinders in the upper jaw ſeven, in the lower ſix.

The moles are furniſhed by nature for perforating the earth in the moſt expeditious manner. Their head is long, and provided with very ſtrong muſcles for enabling it to raiſe up the earth; their ſnout is much lengthened, and is moveable; their hands are large, broad, and flat, and armed with ſtrong, flat, pointed claws, directed backwards for throwing the earth behind them, and the fore legs are very ſhort and ſtrong, and nearly hidden below the ſkin. They have no external ears, and their eyes are very ſmall, and hidden in the fur. They moſtly feed on worms and inſects, and in this way would be of ſervice, were it not that in ſeeking for theſe, they make much havock among young plants by turning up the earth. This circumſtance renders them very troubleſome to gardeners and farmers, who take every method to deſtroy them.

Naturaliſts have deſcribed about 7 ſpecies, viz. 1. * *T. Europæa*, Common M. Black (uſually) with ſhort tail and five-toed feet.—2. *T. Purpuraſcens*, Purple M. Black, with a gloſs of purple, with white tail and five-toed feet. 3. *T. Capenſis*, Cape M. Gold-green, with a gloſs of copper colour, with three-toed fore feet.—4. *T. Rufa*, Red M. Red, with ſhort tail; three-toed fore feet, and four-toed hind feet.—5. *T. Longicaudata*, Long-tailed M. Brown, with tail moderately long, and five-toed feet, hinder ſcaly.—6. *T. Radiata*, Radiated M. Black, with white feet, aad noſe radiated with papillæ.—7. *T. Fuſca*, Brown M. Brown, with white feet and tail, and very broad fore feet.

107 [illegible] Common Mole.

S. 1. *T. Europæa*, Common M. *Moldwarp*, or *Mouldiewarp*.

The figure of this animal is well known. Its eyes are ſo ſmall that it was long doubted whether it really had any. It has, however, been proved by diſſections aſſiſted by the microſcope, that this animal not only has eyes, but that its eyes are every way calculated for diſtinct viſion. It poſſeſſes the ſenſes of hearing and ſmelling in a very acute degree, and according to Ray and Buffon is peculiarly gifted in another faculty, on which it would be improper here to enlarge. It is ſometimes found white.

Moles are found in every part of Europe, and are extremely common in Britain.

Theſe animals, as is well known, live below the earth, where they make ſubterranean paſſages leading from one hillock to another. They live in pairs, and are ſaid to be the moſt domeſtic of all quadrupeds. They ſeldom quit their holes except when compelled to do ſo by heavy rains, or when the earth is ſo much parched by conſtant drought, that they are unable to continue their work of burrowing. In winter they retire to elevated places, where they may be beſt ſecured from inundations; but in ſummer, deſcend to the low and flat lands, eſpecially meadows, which they prefer on account of the earth there being ſofter and lighter.

They generally breed in the ſpring, being found big with young in January and February, and in April a great many of their young may be ſeen.

It appears that moles are capable of ſwimming to a conſiderable diſtance; and a remarkable inſtance of one having been ſeen ſwimming towards a ſmall iſland in the middle of a lake 180 yards from land, is given by Mr Bruce in the third volume of the Linnæan Tranſactions.

People in general are not aware of the great miſchief occaſioned in fields and gardens by theſe animals. We are however informed by Buffon, that in the year 1740 he planted 15 or 16 acres of land with acorns, and that the greater part of them was in a little time carried away by the moles to their ſubterranean retreats. In many of theſe there were found half a buſhel, and in others a buſhel. Buffon, after this circumſtance, cauſed a great number of iron traps to be conſtructed, by which in leſs than three weeks he caught 1300. To this inſtance of the devaſtation occaſioned by theſe animals, we may add the following: In the year 1742 they were ſo numerous in ſome parts of Holland, that one farmer alone caught between 5000 and 6000 of them. The deſtruction occaſioned by theſe animals is however no new phenomenon. We are informed by hiſtory, that the inhabitants of the iſland of Tenedos, the Trojans, and the Æolians, were infeſted by them in the earlieſt ages. For this reaſon a temple was erected to Apollo Smynthius, the deſtroyer of moles.

The catching of moles conſtitutes a profeſſion which is well underſtood in this country. For the particular modes of taking them, we muſt refer our readers to Dr Darwin's Phytologia, p. 370, and to the ſecond volume of the Philoſophical Magazine, p. 34. According to Mortimer, as quoted by Pennant, the roots of white hellebore made into a paſte and laid into their holes, will deſtroy them. They ſeem to have few enemies among other animals, but we are told by Sir Robert Sibbald, that there is a kind of mouſe with a head that deſtroys moles. We are aſſured that theſe animals are not found in Ireland.

The ſkin of the mole is extremely tough; its fur cloſe ſet, and ſofter than the fineſt velvet, or perhaps than the fur of any other animal; it is uſually black, but moles have been found ſpotted with white, and ſometimes, though rarely, they have been ſeen altogether white.

Feræ.

Genus 24. SOREX. *Shrews.*

108 Sorex.

Front teeth in the upper jaw two, long, bifid. In the lower two or four; the intermediate ones ſhorter; canine teeth ſeveral on each ſide; grinders cuſpidated.

This genus is nearly allied to the laſt, and indeed a few of its ſpecies are ſcarcely to be diſtinguiſhed from ſome of the moles. It is therefore not ſurpriſing that Linnæus, in the twelfth edition of his Syſtema Naturæ, ranked two ſpecies under *Sorex*, which ſhould more properly have been placed under *Talpæ*.

There are 16 ſpecies, which are thus diſtinguiſhed. 1. * *S. Araneus*, Common S, or Shrew mouſe. Ruſty brown, whitiſh below, with tail rather ſhorter than the body.—2. *S. Moſchatus*, Muſk S. Web-footed, with naked compreſſed tail.—3. *S. Radiatus*, Canada S. Blackiſh, with lengthened ſnout, radiated at the tip with tentacula.—4. *S. Cæruleſcens*, Perfuming S. Blue-gray, with fleſh-coloured ſnout, feet and tail.—5. *S. Fodiens*, Water S. Black, and white below.—6. *S. Brazilienſis*, Brazilian S. Brown, with three black ſtripes on the back.—7. *S. Surinamenſis*, Surinam S. Bay, yellowiſh aſh colour below, with tail ſhorter than the body.—8. *S. Proboſcideus*, Elephant S. Brown, with very long cylindric ſnout.—9. *S. Leucodon*, White-toothed S. Duſk, white below, with tail of middling length.—10. *S. Tetragonurus*, ſquare-tailed S. Quadrangular tail.—11 *S. Leucurus*, White-tailed S. Browniſh, whitiſh beneath, with ſhort tail, whitiſh towards the tip.—12. *S. Unicolor*, Cinereous S. Duſky aſh-coloured, with tail narrowed at the baſe.—13. *S. Murinus*, Murine S. Brown, with aſh-coloured feet and tail, the latter of middling length.—15. *S. Puſillus*, Perſian S. With rounded ears, and ſhort ſubdiſtichious tail.—15. *S. Minutus*, Minute S. With very long ſnout.—16. *S. Exilis*, Pygmy S. Extremely ſmall, with very thick cylindric tail.

109 Common Shrew.

1. *S. Araneus*, Shrew Mouſe, or Hardy S. The length of this little animal, from the end of the noſe to the origin of the tail, is two inches and a half; that of the tail, near one inch and a half; the noſe is very long and ſlender, and the upper mandible is much longer than the lower; the ears are ſhort and rounded, the eyes very ſmall, and like thoſe of the mole, almoſt concealed in the hair. The colour of the head, and upper part of the body, is of a browniſh dark red, the belly of a dirty white; the tail is covered with ſhort dark hairs, the legs are very ſhort; the hind legs are placed very far back; the feet are divided into five diſtinct toes.

The teeth are 28 in number, and of ſo ſingular a form, as to engage the attention of moſt naturaliſts. Geſner is of opinion, that nature ſeems to have formed in this animal teeth of mixed ſhape, between thoſe of mice and ſerpents; the two upper fore teeth are very ſharp, and on each ſide of them grows a minute proceſs.

Feræ. ceſs, ſcarcely viſible, except on a near inſpection; the other teeth are placed cloſe together, are very ſmall, and ſcarcely ſeparated.

The ſhrew mouſe inhabits old walls, heaps of ſtones, or holes in the earth; is frequently found near outbuildings, hay ricks, dunghills, and neceſſary houſes; it lives on inſects, corn, and any filth, and has been obſerved rooting like a hog in the laſt named places. Either from its food or its nature, it has a very diſagreeable ſmell, inſomuch that the cat will kill it, yet refuſes to eat it. It is ſaid to bring four or five young at a time. It is a very common animal in this country.

110 Erinaceus.

Genus 25. ERINACEUS. *HEDGEHOGS.*

Front teeth, two both above and below; thoſe of the upper jaw diſtant, of the lower approximated. Canine teeth on each ſide, in the upper jaw five, in the lower three. Grinders on each ſide, both above and below, four. Body covered on the upper parts with ſpines.

There are five ſpecies, viz. 1. * *Erinaceus Europæus*, European or common H. With rounded ears and creſted noſtrils.—2. *E. Inauris*, Earleſs H. Without external ears.—3. *E. Auritus*, Long-eared H. With long oval ears, and creſted noſtrils.—4. *E. Madagaſcarienſis*, Striped H. With ſpines and long briſtles; the body longitudinally banded with black and white, with long, ſharp pointed ſnout.—5. *E. Malaccenſis*, Malacca H. With long ſpines and pendulous ears.

111 European, Common Hedgehog, Fig. 50.

1. *Erinaceus Europæus*, Common Hedgehog, or Urchin.

The uſual length of this animal, excluſive of the tail, is about ten inches; the tail is little more than an inch long, but ſo concealed by the ſpines as ſcarcely to be viſible. The ſnout is like that of the hog; the upper jaw being much longer than the lower, and the end flat; the noſtrils are narrow, terminated on each ſide by a looſe thin flap; the colour of the ſnout is duſky; it is covered with a few ſcattered hairs; the upper part of the head, the ſides, and the rump, are clothed with ſtrong ſtiff hair, approaching the nature of briſtles, of a yellowiſh and aſh hue.

The legs are ſhort, of a duſky colour, and almoſt bare; the toes on each foot are five in number, long, and ſeparated the whole way; the thumb or interior toe is much ſhorter than the others; the claws long but weak; the whole upper part of the body and ſides are ſtrongly covered with cloſe ſpines of an inch in length, and very ſharp pointed; their lower part is white, the middle black, the points white. The mouth is ſmall, but full of teeth. The barbarity of anatomiſts furniſhes us with an amazing inſtance of its patience; one that was diſſected alive, and whoſe feet were nailed down to the table, endured that, and every ſtroke of the operator's knife, without even one groan.

It is found in moſt parts of Europe, and is not uncommon in this iſland.

It produces four or five young at a birth, which are ſoon covered with prickles like thoſe of the parent, but ſhorter and weaker.

It is a nocturnal animal, keeping retired in the day, but is in motion the whole night in ſearch of food. It generally reſides in ſmall thickets, in hedges, or in ditches covered with buſhes, lying well wrapped up in moſs, graſs, or leaves; its food is roots, fruits, worms, and inſects. It lies under the undeſerved reproach of ſucking cattle, and hurting their udders; but the ſmallneſs of its mouth renders that impoſſible. It is a mild, helpleſs, and patient animal; and would be liable to injury from every enemy, had not providence guarded it with a ſtrong covering, and the power of rolling itſelf into a ball, by that means ſecuring the defenceleſs parts. It is hunted with dogs; but few of them will venture to attack it while rolled up, ſo that its perſecutors throw it into water, to oblige it to unroll itſelf. Its fleſh is eſteemed good food.

The hedgehog may be tamed; and we are told of one that lived at the Angel inn at Felton in Northumberland in 1799, which performed the duty of a turnſpit, as well in every reſpect as the dog of that name; ran about the houſe as familiarly as any other domeſtic quadruped; diſplayed a facility till then unknown in this ſpecies of animals; and uſed to anſwer to the name of *Tom*.

This order contains 12 genera, and about 134 ſpecies.

CHAP. IV. GLIRES.

Gen. 26. HYSTRIX. *PORCUPINE.*

Hyſtrix.

Front teeth two, both in the upper and under jaw, obliquely cut; grinders eight. Body covered with ſpines intermixed with hairs. Four toes on the fore feet, five on the hind.

There are ſix ſpecies; viz.

1. *H. Criſtata*, Long ſpined Porcupine; with four-toed fore feet, and five-toed hind feet; creſted head, and ſhort tail.—2. *H. Prehenſilis*, Prehenſile P. Short-ſpined, with four-toed feet; and long half-naked prehenſile tail.—3. *H. Mexicana*, Mexican P. Short-ſpined, with four-toed feet, and tail of moderate length. —4. *H. Macroura*, Long-tailed P. Short-ſpined, with five-toed feet, and very long tail, tufted at the end with club-ſhaped briſtles.—5. *H. Faſciculata*, Bruſh-tailed P. Four-toed fore feet, five-toed hind feet, and tail terminated by a tuft of flattened briſtles.—6. *H. Dorſata*, Canada P. Short-ſpined, with very long fur; four-toed fore feet, five-toed hind feet; ſpiny back, and ſhortiſh tail.

112 Criſtata, or Common Porcupine, Fig. 51.

1. *H. Criſtata*, Common Porcupine.—The figure which we have given of this animal will convey a better idea of it than any deſcription. We may remark only that it is about two feet long from head to tail; and that the tail is about four inches long, being almoſt entirely hidden by the quills and long hair.

It is a native of Africa, India, and the Indian iſlands, and is found in ſome of the warmer parts of Europe; particularly in Sicily and Malta.

It was long believed that the porcupine had the power of darting its quills to a conſiderable diſtance, at any enemy that aſſaulted it. This is proved to have been a vulgar error, ariſing probably from the manner in which the quills are detached when the animal is moulting, at which time they are often thrown with a jerk to a little diſtance. The quills ſeem intended merely as weapons of defence, and when attacked, the animal has the power of raiſing them, as was remarked with reſpect to [illegible].

[illegible] The fleſh of the porcupine is eaten in ſome places; and we are told by Mr Brydone that when in Sicily, he dined on it, and found it extremely luſcious, ſoon palling on the appetite.

This animal feeds chiefly on fruits, roots, and vegetable ſubſtances. It commonly lives under ground, ſleeps much by day, and goes in ſearch of food only during the night. The female produces two young at a birth, and theſe, when taken early, are eaſily tamed.

114 Cavia.

Gen. 27. CAVIA, *CAVY.*

Front teeth two, wedge-ſhaped; grinders eight. Toes on the fore feet, four or five; on the hind feet, from three to five. Tail very ſhort, or wanting. No clavicles.

The animals of this genus are chiefly found in America; they live on vegetable ſubſtances, and inhabit holes in the ground, or beneath the roots of trees. There are ſeven ſpecies; viz.

1. *Cavia Cobaya*, Variegated Cavy, or Guinea Pig. Tailleſs; generally variegated either with black and white, or rufous, &c.—2. *C. Paca*, Spotted C. Tailed, with five-toed feet, and ſides marked by rows of yellowiſh white ſpots.—3. *C. Capybara*, Capybara. Tailleſs, with three-toed palmated hind feet.—4. *C. Aguti*, Aguti. Tailed, with the body reddiſh brown, and the belly yellowiſh.—5. *C. Acouchy*, Acouchy. Tailed, with olive-coloured body.—6. *C. Aperia*, Rock C. Tailleſs, with reddiſh aſh-coloured body.—7. *C. Patagonica*, Patagonian C. Ruſty gray, whitiſh below, with extremely ſhort naked tail; large white patch on each thigh, and black rump.

115 *Cobaya*, Guinea Pig. 1. *C. Cobaya*, Reſtleſs Cavy, or Guinea Pig.—This animal is pretty well known among us, being frequently kept as a kind of pet. It is a native of South America, and naturally of a chilly tender conſtitution; yet it lives and breeds in our climates when kept in the houſe, and properly fed. Few animals breed ſo early as the Guinea pig. Though it does not attain its full growth till eight or nine months old, it has been known to bring forth at two months. The female goes with young about three weeks, and at her firſt litter produces four or five young, but her ſubſequent litters often conſiſt of ten, or twelve. As theſe animals are thus prolific, and will breed five or ſix times in a year, it is computed that a thouſand of them may be produced in one year from a ſingle pair. They ſeem capable of no ſentiment but the loweſt ſenſuality, and paſs their whole time in eating, ſleeping, &c. They live entirely on vegetable food, and are very fond of parſley, apples, and other fruits. They eat often, but little at a time.

They are very neat and cleanly, and are often ſeen dreſſing each other's fur. They are eaſily tamed, but ſeem to feel no attachment to man. They grunt like a pig, make a chirping noiſe when pleaſed, and utter a ſharp cry when hurt.

The fleſh may be eaten, but is very indifferent.

116 C

Gen. 28. CASTOR. *BEAVER.*

Front teeth in the upper jaw truncated, and hollowed with a tranſverſe angle; in the lower jaw tranſverſe at the tips. Grinders on each ſide four. Tail long, depreſſed and ſcaly. Collar bones in the ſkeleton. Glires.

There are two ſpecies; viz.

117 Fiber, Common Beaver. Fig. 52.

1. *C. Fiber*, Common Beaver. Cheſnut-coloured, with flat ovate naked tail.—2. *C. Huidobrius*, Chili B. With long, compreſſed, lance-ſhaped, hairy tail; lobed fore feet, and webbed hind feet.

1. *C. Fiber*, Common Beaver.—This animal is eaſily diſtinguiſhed from all quadrupeds by the peculiar appearance of its tail, which is of an oval form, nearly flat, except on its upper ſurface, where it is ſlightly convex, entirely deſtitute of hair, except at the baſe, and marked with ſcaly diviſions like the ſkin of a fiſh. The body is about three feet long, and the tail about a foot in length. The general colour of the fur is a deep cheſnut, but it is ſometimes found perfectly black, white, cream-coloured, or ſpotted.

The beaver is found in moſt of the northern parts of Europe and Aſia, and is very abundant in North America. It was once met with in Britain, but the ſpecies has long been there extinct. It delights in ſhady watery ſituations.

Many accounts have been given of the manners and labours of this extraordinary animal, but we believe none are in general more correct than the following by Buffon.

The beavers begin to aſſemble in the month of June or July, for the purpoſe of uniting into ſociety. They arrive in numbers from all corners, and ſoon form a troop of 200 or 300. The place of rendezvous is generally the place fixed for their eſtabliſhment, and is always on the banks of waters. If the waters be flat, and never riſe above their ordinary level, as in lakes, the beavers make no bank or dam; but in rivers or brooks, where the waters are ſubject to riſings and fallings, they build a bank, and by this artifice they form a pond or piece of water which remains always at the ſame height. The bank traverſes the river from one ſide to the other, like a ſluice, and it is often from 80 to 100 feet long, by 10 or 12 broad at the baſe. This pile, for animals of a ſize ſo ſmall, appears to be enormous, and ſuppoſes an incredible labour. But the ſolidity with which the work is conſtructed is ſtill more aſtoniſhing than its magnitude. The part of the river where they erect this bank is generally ſhallow. If they find on the margin a large tree, which can be made to fall into the water, they begin with cutting it down, to form the principal part of their work. This tree is often thicker than the body of a man. By gnawing the foot of the tree with their four cutting teeth, they accompliſh their purpoſe in a very ſhort time, and always make the tree fall acroſs the river. They next cut the branches from the trunk to make it lie level. Theſe operations are performed by the whole community. Several beavers are employed in gnawing the foot of the tree, and others in lopping off the branches after it has fallen. Others at the ſame time traverſe the banks of the river, and cut down ſmaller trees, from the ſize of a man's leg to that of his thigh. Theſe they dreſs, and cut to a certain length to make ſtakes of them, and firſt drag them by land to the margin of the river, and then by water to the place where the building is carrying on. Theſe piles they ſink down, and

Glires.

and interweave the branches with the larger ſtakes. This operation implies the vanquiſhing of many difficulties; for to dreſs theſe ſtakes, and to put them in a ſituation nearly perpendicular, ſome of the beavers muſt elevate, with their teeth, the thick ends againſt the margin of the river, or againſt the croſs tree, while others plunge to the bottom, and dig holes with their fore feet, to receive the points that they may ſtand on end. While ſome are labouring in this manner, others bring earth, which they plaſh with their feet, and beat firm with their tails. They carry the earth in their mouths, and with their fore feet, and tranſport it in ſuch quantities that they fill with it all the intervals between the piles. Theſe piles conſiſt of ſeveral rows of ſtakes of equal height, all placed oppoſite to each other, and extend from one bank of the river to the other. The ſtakes facing the under part of the river, are placed perpendicularly; but the reſt of the work ſlopes upwards, to ſuſtain the preſſure of the fluid, ſo that the bank, which is 10 or 12 feet wide at the baſe, is reduced to two or three at the top. It has, therefore, not only all the neceſſary thickneſs and ſolidity, but the moſt advantageous form for ſupporting the weight of the water, for preventing its iſſue, and to repel its efforts. Near the top, or thinneſt part of the bank, they make two or three ſloping holes, to allow the ſurface water to eſcape, and theſe they enlarge or contract, according as the river riſes or falls; and when any breaches are made in the bank by ſudden or violent inundations, they know how to repair them as ſoon as the water ſubſides.

It would be ſuperfluous, after this account of their public work, to give a detail of their particular operations, were it not neceſſary, in a hiſtory of theſe animals, to mention every fact, and were not the firſt great ſtructure made with a view to render their ſmaller habitations more commodious. Theſe cabins or houſes are built upon piles near the margin of the pond, and have two openings, the one for going to the land, and the other for throwing themſelves into the water. The form of the edifices is either oval or round, ſome of them larger and ſome leſs, varying from four or five, to eight or ten feet diameter. Some of them conſiſt of three or four ſtories, and their walls are about two feet thick, raiſed perpendicularly upon planks, or plain ſtakes, which ſerve both for foundations and floors to their houſes. When they conſiſt but of one ſtory, the walls riſe perpendicularly only a few feet, afterwards aſſume a curved form, and terminate in a dome or vault, which ſerves them for a roof. They are built with amazing ſolidity, and neatly plaſtered both without and within. They are impenetrable to rain, and reſiſt the moſt impetuous winds. The partitions are covered with a kind of ſtucco, as nicely plaſtered as if it had been executed by the hand of man. In the application of this mortar, their tails ſerve for trowels, and their feet for plaſhing. They employ different materials, as wood, ſtone, and a kind of ſandy earth, which is not ſubject to diſſolution in water. The wood they uſe is almoſt all of the light and tender kinds, as alders, poplars, and willows, which generally grow on the banks of rivers, and are more eaſily barked, cut, and tranſported, than the heavier and more ſolid ſpecies of timber. When they once attack a tree, they never abandon it till they cut it down, and, carry it off. They always begin the operation of cutting at the foot, or a foot and a half above ground; they labour in a ſitting poſture; and, beſide the convenience of this ſituation, they enjoy the pleaſure of gnawing perpetually the bark and wood, which are moſt palatable to their taſte; for they prefer freſh bark and tender wood to moſt of their ordinary aliment. Of theſe proviſions they lay up ample ſtores, to ſupport them during the winter; but they are not fond of dry wood. It is in the water, and near their habitations, that they eſtabliſh their magazines. Each cabin has its own magazine, proportioned to the number of its inhabitants, who have all a common right to the ſtore, and never pillage their neighbours. Some villages are compoſed of 20 or 25 cabins. But theſe large eſtabliſhments are rare, and the common republic ſeldom exceeds 10 or 12 families, of which each has his own quarter of the village, his own magazine, and his ſeparate habitation. They allow no ſtrangers to ſit down in their neighbourhood. The ſmalleſt cabins contain 2, 4, or 6, and the largeſt 18, 20, and, it is alledged, ſometimes 30 beavers. They are almoſt always equally paired, being the ſame number of females as of males. Thus, upon a moderate computation, the ſociety is often compoſed of 150 or 200, who all, at firſt, laboured jointly, in raiſing the great public building, and afterwards in ſelect tribes or companies, in making particular habitations. In this ſociety, however numerous, an univerſal peace is maintained. Their union is cemented by common labours, and it is rendered perpetual by mutual convenience, and the abundance of proviſions which they amaſs, and conſume together. Moderate appetites, a ſimple taſte, an averſion againſt blood and carnage, deprive them of the idea of rapine and war. They enjoy every poſſible good, while man only knows how to pant after it. Friends to each other, if they have ſome foreign enemies, they know how to avoid them. When danger approaches, they advertiſe one another by ſtriking their tail on the ſurface of the water, the noiſe of which is heard at a great diſtance, and reſounds through all the vaults of their habitations. Each takes his poſt; ſome plunge into the lake, others conceal themſelves within their walls, which can only be penetrated by the fire of heaven, or the ſteel of man, and which no animal will attempt either to open or to overturn. Theſe retreats are not only very ſafe, but neat and commodious. The floors are ſpread over with verdure; the branches of the box and the fir ſerve them for carpets, upon which they permit not the leaſt dirtineſs. The window that faces the water anſwers for a balcony to receive the freſh air, and to bathe. During the greateſt part of the day, they ſit on end, with their heads and anterior parts of the body elevated, and their poſterior parts ſunk in the water. This window is made with caution, the aperture of which is ſufficiently raiſed to prevent its being ſtopped up with ice, which, in the beaver climates, is often two or three feet thick. When this happens, they ſlope the ſole of the window, cut obliquely the ſtakes which ſupport it, and thus open a communication with the unfrozen water. This element is ſo neceſſary, or rather ſo agreeable to them, that they can ſeldom diſpenſe with it. They often ſwim a long way under the ice; it is then that they are moſt eaſily taken, by attacking the cabin on one hand, and, at the ſame time, watching at a hole made at ſome diſtance,

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diſtance, where they are obliged to repair for the purpoſe of reſpiration. The continual habit of keeping their tail and poſterior parts in the water, appears to have changed the nature of their fleſh. That of their anterior parts, as far as the reins, has the taſte and conſiſtence of the fleſh of land or air animals; but that of the tail and poſteriors has the odour and all the other qualities of fiſh. The tail, which is a foot long, an inch thick, and five or ſix inches broad, is juſt like an extremity or genuine portion of a fiſh attached to the body of a quadruped. It is entirely covered with ſcales, and with a ſkin perfectly ſimilar to thoſe of large fiſhes. They may be ſcraped off with a knife, and, after falling, they leave an impreſſion on the ſkin, as is the caſe with all fiſhes.

It is in the beginning of ſummer that the beavers aſſemble. They employ the months of July and Auguſt in the conſtruction of their bank and cabins. They collect, in September their proviſions of bark and wood; afterwards they enjoy the fruits of their labours, and taſte the ſweets of domeſtic happineſs. This is the time of repoſe and the ſeaſon of love. Knowing and loving one another from habit, from the pleaſures and fatigues of a common labour, each couple join not by chance, nor by the preſſing neceſſities of nature, but unite from choice and from taſte. They paſs together the autumn and the winter, and perfectly ſatisfied with each other, they never ſeparate. At eaſe in their cabins, they go not out but upon agreeable or uſeful excurſions, to bring in ſupplies of freſh bark, which they prefer to what is too dry, or too much moiſtened with water. The females are ſaid to go pregnant for four months; they bring forth in the end of winter, and generally produce two or three young ones. About this time, they are left by the males, who retire to the country to enjoy the pleaſures and the fruits of the ſpring. They return occaſionally to their cabins, and are occupied in nurſing, protecting, and rearing their young, who at the end of a few weeks, are in a condition to follow their dams. The females, in their turn, make little excurſions to recruit themſelves by the air, by eating freſh bark and herbage; and in this manner paſs the ſummer upon the waters, and in the woods. They aſſemble not again till autumn, unleſs their banks or cabins be overturned by inundations; for when accidents of this kind happen, they ſuddenly collect their forces, in order to repair the breaches which have been made.

Some places they prefer to others for their habitations; and they have been obſerved, after having their labours frequently deſtroyed, to return every ſummer to repair them, till, being fatigued with this perſecution, and weakened by the loſs of ſeveral of their numbers, they took the reſolution of changing their abode, and of retiring to ſolitudes ſtill more profound. It is in winter that they are chiefly ſought by the hunters, becauſe their fur is not perfectly ſound in any other ſeaſon: and, after their village is ruined, and numbers of them are taken, the ſociety is ſometimes too much reduced to admit of a freſh eſtabliſhment; but thoſe which eſcape death or captivity, diſperſe and become vagabonds. Their genius, withered by fear, never again expands. They hide themſelves and their talents in holes; or, ſunk to the condition of other animals, they lead a timid and inactive life. Occupied only by preſſing wants, and exerting merely their individual powers, they loſe for ever thoſe ſocial qualities which we have been ſo juſtly admiring.

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The beaver is hunted for the ſake of its fur, which, as is well known, forms a conſiderable article in the manufacture of fine hats, as well as for the drug called *Caſtor*, for an account of which ſee Materia Medica. Its fleſh is eaten in ſome places, and is ſaid to have a fiſhy taſte.

Genus 29. Mus. *Rats and Mice.* 113 Mus.

Upper front teeth wedge-ſhaped. Grinders on each ſide three, ſometimes only two. Clavicles or collarbones in the ſkeleton.

Theſe animals generally live in holes in the ground, are very ſwift, and able to climb trees. Their food is chiefly vegetable, which moſt of them ſeek in the night, keeping in their retreats during the day. They feed in a ſomewhat upright poſition, carrying the food to their mouth with their paws. They are very prolific, the females breeding many times a year and bringing numerous litters. The females have uſually eight teats. The ears of theſe animals are uſually ſhort and rounded; their fore feet are commonly four-toed, with a warty excreſcence in place of a fifth. Many of them are almoſt amphibious, living much in the water and ſwimming very well. A few of them are furniſhed with cheek pouches for carrying food to their holes. They are found in almoſt all parts of the world, and many of them are natives of Britain.

The ſpecies are very numerous, and are therefore by Dr Shaw diſtributed into the following ſections.

A. *With flattened tails.*

1. *M. Zibethicus*, Muſk Rat. Ruſty brown, with long compreſſed lanceolate tail, and unwebbed feet.

B. *With round naked tails.*

2. *M. Pilorides*, Pilori. Whitiſh, with longiſh, ſcaly, obtuſe truncated tail.—3. *M. Caraco*, American rat. Gray, with long, ſcaly, ſomewhat obtuſe tail, and ſlightly ſemi palmated hind feet.—4. * *M. Decumanus*, Norway R. Gray, ſtiff-haired, with very long ſcaly tail, and body whitiſh below.—5. * *M Rattus*, Black R. Blackiſh, aſh-coloured beneath, with very long ſcaly tail.—6. *M. Malabaricus*, Bandicot R. Gray, with naked round ears, and the two exterior toes of the hind feet ſhorter than the reſt.—7. *M Perchal*, Perchal R. Ruſty brown, with the hind legs larger than the fore.—8 **M Muſculus*, Common M. Brown, aſh-coloured beneath, with four-toed fore feet, five-toed hind feet, and long nearly naked tail.—9. * *M. Sylvaticus*, Wood M. Yellowiſh brown, with long naked tail, and body white beneath, the colours being abruptly ſeparated on the ſides.—10. *M. Agrarius*, Ruſtic M. Yellowiſh brown, with long ſcaly tail and black dorſal ſtreak.—11. *M. Meſſorius*, Harveſt M. Ruſty, white beneath, with long ſlightly hairy tail, and ears longer than the fur of the head.—12. *M. Minutus*, Minute M. Ruſty, whitiſh beneath, with long ſcaly tail.—13. *M. Soricinus*, Soricine M. Yellowiſh gray, with long ſnout, round naked ears, and hairy tail of moderate length.—14. *M. Vagus*, Wandering M. Aſh-coloured, with black dorſal band, very long naked tail, and plaited ears.—15. *M. Betulinus*,

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tulinus, Birch M. Fulvous, with black dorſal band, plaited ears, and very long naked tail.—16. *M. Striatus*, Streaked M. Rufous brown, with longiſh naked tail, and the body marked by ſeveral longitudinal rows of white ſpots.—17. *M. Barbarus*, Barbary M. Brown, marked with ten pale ſtreaks; with tail of middling length, three-toed fore feet, and five-toed hind feet.

C. *With hairy tails, in general either of a middling length or ſhort.*

18. *M. Cyanus*, Blue R. Blue, whitiſh beneath, with four-toed fore feet, five-toed hind feet, and ſlightly hairy tail of middling length.—19. *M. Saxatilis*, Rock R. Grayiſh brown, with longiſh tail; ears longer than the fur, and feet about four toed.—20. *M. Amphibius*, Water R. Blackiſh brown, aſh-coloured below, with ears ſcarcely projecting from the fur; fore feet about four-toed, and tail about half as long as the body.—21. *M. Scherman*, Scherman R. Deep brown, aſh-coloured below, with ſlightly hairy tail of moderate length, ſmall feet, and ears ſhorter than the fur.—22. *M. Lemmus*, Lemming R. Short-tailed, with ears ſhorter than the fur, five-toed fore feet, and body white below, variegated above with black, white and fulvous.—23. *M. Arvalis*, Meadow M. Duſky ruſty, ſhort-tailed, deep aſh-coloured beneath, with ears longer than the fur, and about four-toed fore feet.—24. *M. Torquatus*, Collared M. Short-tailed, ruſty, with duſky variegations; ears ſhorter than the fur; five-toed fore feet, interrupted white collar, and black ſpinal ſtripe.—25. *M. Lagurus*, Hare-tailed M. Short-tailed, aſh-coloured, white below; ears ſhorter than the fur; about four-toed fore feet, and black dorſal line.—26. *M. Economus*, Economic R. Short-tailed, tawny whitiſh below, with naked ears concealed by the fur, and about four-toed fore feet.—27. *M. Alliarius*, Garlick M. Aſh-coloured, whitiſh below, with rather large ears ſlightly hairy, and tail about an inch long.—28. *M Rutilus*, Red M. Fulvous aſh-coloured beneath, with tail about an inch long; ears longer than the fur, and about four-toed feet.—29 *M. Laniger*, Woolly M. Aſh-coloured, with four-toed fore feet, five toed hind feet, and tail of middling length.—30. *M. Gregalis*, Baikal M. Gray, with ears ſhorter than the fur, about four-toed fore feet, and tail about one inch and a half long —31. *M. Socialis*, Social M. Pale gray, white beneath, with very ſhort rounded ears, about four-toed fore feet, and tail of half an inch long.—32. *M. Hudſonius*, Hudſon's Bay M. Short-tailed, earleſs, aſh-coloured, white beneath, with yellowiſh brown dorſal ſtripe, and five-toed hind feet.

D. *With cheek pouches for the temporary reception of their food.*

33. *M. Cricetus*, Hamſter R. Reddiſh brown, pouched, with three white ſpots on each ſide, and deep black belly.—34. *M. Burſarius*, Canada R. Aſh-coloured, with ſhort nearly naked tail, pouched cheeks, and the claws of the fore feet very large, and formed for burrowing in the ground.—35. *M. Accedula*, Yaik R. Yellowiſh gray, whitiſh beneath, with pouched cheeks and ſinuated ears.—36. *M. Arenarius*, Sand R. Aſh-coloured, pouched; with the feet, ſides of the body, belly and tail white.—37. *M. Phæus*, Aſtracan M. Aſh brown, pouched, white beneath.—38. *M. S*[illegible] Aſh-coloured, pouched, white beneath, with black ſpinal line, and the ſides ſpotted with white.—39. *M. Furunculus*, Baraba R. Yellowiſh gray, pouched, whitiſh beneath, with black dorſal ſtreak.

E. *Subterranean or Ground Rats, reſembling Moles in habit and manner of life:*

40. *M. Maritimus*, Coaſt R. Pale yellowiſh brown, whitiſh beneath, with very large and long naked teeth, five-toed feet, no external ears, and ſhort tail.—41. *M. Typhlus*, Blind R. Short-tailed, rufous brown, duſky beneath, with five-toed fore feet, broad front teeth and without eyes or external ears.—42. *M. Aſpalex*, Daurian R. Short-tailed, earleſs, yellowiſh aſh-coloured, with large wedged fore teeth, and long claws on the fore feet.—43. *M. Capenſis*, Cape R. Short-tailed, reddiſh aſh, paler below, with very large naked fore teeth, five-toed feet and white muzzle.—44. *M. Talpinus*, Mole R. Short-tailed, brown, with large wedged front teeth, no external ears, and five-toed fore feet formed for burrowing.

4. * *M. Decumanus*, Common brown or Norway rat.—This is one of the moſt common ſpecies of rat, by which our houſes and granaries are infeſted, and is too well known to require any deſcription. It was originally, it is ſaid, brought to this country from Norway, and has multiplied ſo prodigiouſly, and is ſo ſtrong and voracious, as to form one of our moſt unpleaſant inmates. St Pierre informs us that in the Iſle of France theſe rats are found in ſuch prodigious ſwarms, that 30,000 of them have been killed in ſome of the houſes in a ſingle year. It is even ſaid that the Dutch entirely abandoned that poſt from the number of rats by which it was infeſted. They will in a ſingle night entirely deſtroy a whole crop of corn. They frequently infeſt ſhips in ſuch numbers as to deſtroy large quantities of proviſions, and even endanger the veſſel by gnawing its timbers. When the Valiant came from the Havannah, in the year 1766, the rats had increaſed on board her ſo much as to deſtroy nearly one hundred weight of biſcuit in a day; and on the ſhip being ſmoked between decks, to ſuffocate the rats, ſix hampers were for ſome time filled every day with thoſe that had been thus killed.

In ſummer it frequents the banks of rivers, ponds, and ditches; where it lives on frogs, fiſhes, and ſmall animals. But its rapacity is not confined entirely to theſe: It deſtroys rabbits, poultry, young pigeons, &c. It infeſts the granary, the barn, and the ſtore-houſe; does infinite miſchief among corn and fruit of all kinds; and, not content with ſatisfying its hunger, frequently carries off large quantities to its hiding place. It is a bold and fierce little animal; and when cloſely purſued, will turn and faſten on its aſſailant. Its bite is keen, and the wound it inflicts is painful, and difficult to heal, owing to the form of its teeth, which are long, ſharp, and irregular.

Their produce is enormous, as the female brings forth from 12 to 18 at a litter, and uſually breeds thrice a year, ſo that from a ſingle pair, provided food were ſufficiently plentiful, and they had no enemies to diminiſh their numbers, there might be propagated above 1,000,000 in the ſpace of two years! Their enemies are, however, numerous. They are deſtroyed by dogs, cats, and eſpecially weaſels; and it is ſaid that [illegible] this rat is much dreaded by [illegible], as the whole [illegible] is by those [illegible] that are their prey. They are commonly taken in traps, or destroyed by poison, which latter is the easiest method. Mr [illegible] recommends for the purpose a composition of [illegible] mixed with oatmeal, and a small proportion of [illegible] [illegible].

33. *M. Cricetus*, Hamſter, or Hamſter Rat.—This is one of the fierceſt of the rat tribe, being rather larger and much ſtronger than the Norway rat. It is of a pale reddiſh brown colour above, and blackiſh below, with a whitiſh muzzle, reddiſh cheeks, pretty large rounded ears, and a ſhort tail almoſt bare. The male is always larger than the female.

The hamſter is the only European ſpecies of rat that is furniſhed with pouches. It is found in Auſtria, Sileſia, and many parts of Germany. It lives under ground, burrowing down obliquely. At the end of its paſſage, the male ſinks one perpendicular hole, and the female ſeveral, ſometimes ſeven or eight. At the end of theſe are formed various vaults, either as lodges for themſelves and young, or as ſtore-houſes for food. Each young has its different apartment, and each ſort of grain its different vault; the former is lined with ſtraw or graſs. The vaults are of different depths, according to the age of the animals: a young hamſter makes them ſcarcely a foot deep; an old one ſinks them to the depth of four or five. The whole diameter of the habitation, with all its communications, is ſometimes eight or 10 feet. The female breeds twice or three times a year, and produces from ſix to 18 at a litter. The young grow very rapidly, and are ſoon able to ſhift for themſelves. The male and female have always ſeparate burrows; for, except in their ſhort ſeaſon of courtſhip, they have no intercourſe. The whole race is ſo malevolent, as conſtantly to reject all ſociety with one another. They will fight, kill, and devour each other. The female ſhows little affection even for her young; for if any perſon digs into the hole, ſhe attempts to ſave herſelf by burrowing deeper into the earth, leaving them a prey to the intruder. They would willingly follow her, but ſhe is deaf to their cries, and even ſhuts up againſt them the hole which ſhe has made. They feed on grain and fruits, which they collect in large quantities in their granaries; and in ſome countries they do ſo much damage among the corn, that a conſiderable reward is offered for deſtroying them. According to Mr Sultzer, they abound to ſuch a degree in Gotha, that in one year 11,564, in another 54,429, and in a third 80,136 of their ſkins were delivered in at the hotel de ville of that capital.

The life of a hamſter (ſays Buffon) is divided between eating and fighting. He ſeems to have no other paſſion than that of rage, which induces him to attack every animal that comes in his way, without in the leaſt attending to the ſuperior ſtrength of the enemy. Ignorant of the art of ſaving himſelf by flight, rather than yield, he will allow himſelf to be beaten to pieces with a ſtick. If he ſeizes a man's hand, he muſt be killed before he quits his hold. The magnitude of the horſe terrifies him as little as the addreſs of the dog, which is fond of hunting him. When the hamſter perceives a dog at a diſtance, he begins by emptying his cheek pouches, if they happen to be filled with grain. He then blows them up ſo prodigiouſly, that the ſize of the head and neck greatly exceeds that of the reſt of the body. He raiſes himſelf on his hind legs, and thus darts upon the enemy. If he catches hold, he never quits it, but with the loſs of life. But the dog generally ſeizes him behind, and ſtrangles him. This ferocious diſpoſition prevents the hamſter from being at peace with any animal whatever. He even makes war againſt his own ſpecies, not excepting the females. When two hamſters meet, they never fail to attack each other, and the ſtronger always devours the weaker. A combat between a male and a female commonly laſts longer than between two males. They begin by purſuing and biting each other; then each of them retires to a ſide, as if to take breath; a little after they renew the combat, and continue to fly and to fight, till one of them falls. The vanquiſhed uniformly ſerves for a repaſt to the conqueror.

Genus 30. HYDROMYS (F). 121 Hydromys.

Cutting teeth two in each jaw; canine; grinders two in each row, furrowed on the ſide, and having a double excavation on the crown. Feet five-toed; toes on the fore feet three; thoſe on the hind webbed. Tail round, and covered with ſhort hair.

This is a new genus, conſtituted by Geoffroy to comprehend the coypou, which is commonly ranked as a ſpecies of *mus*, and two other ſpecies that had not been deſcribed.

His account of the genus is contained in the ſixth volume of the *Annales de Muſeum National*, and a tranſlation of his memoir is given in the 22d volume of the Philoſophical Magazine.

The three ſpecies are thus diſtinguiſhed by Geoffroy.

1. *H. Coypus*, Coypou H. Hair cheſnut brown on the back, red on the flanks, and bright brown below the belly.—2. *H. Chryſogaſter*, Yellow-bellied H. Hair cheſnut brown above, orange below.—3. *H. Leucogaſter*, White-bellied H. Hair brown above, white below.

122 *Coypus*, Coypou Rat. Fig. 55. 1. *H. Coypus*, Coypou, or Coypu Rat.—This curious animal was firſt deſcribed by Molina, who ſpeaks of it as a ſpecies of water rat, of the ſize and colour of an otter. According to Geoffroy, it is a large animal, being about 14 inches from noſe to tail, with a tail about two inches long. The general tint of the hair and on the back is a cheſnut brown. This colour becomes brighter on the flanks, and paſſes to bright red; under the belly it is only a dirty and almoſt dark ruſſet. Yet this colour is ſufficiently changeable according to the manner in which the coypou raiſes or lowers its hair. This mobility in the tone of its fur ariſes from each hair being of an aſh-coloured brown at the root, and bright red at the point. The felt concealed under the

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(F) Geoffroy chooſes to ſpell this word *hydromis*; but we have thought the orthography that we adopt more conformable to the Greek origin of the name, viz Ὑδρόμυς, or *water-rat*.

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the long hair is an aſh brown, of a brighter tint under the belly. The long hair on the back has the points only reddiſh, and that on the flanks is of the latter colour throughout the half of its length.

As in all animals which go frequently into the water, the hair of the tail is thin, ſhort, ſtiff, and of a dirty red colour: in its naked parts it is ſcaly. The contour of the mouth and extremity of the muzzle are white. The whiſkers, which are long and ſtiff, are alſo white, ſome black hairs excepted. Among the great number of ſkins which form part of the collection of M. Bechem, M. Geoffroy ſaw ſome belonging to animals which had no doubt been afflicted with the albine diſeaſe; in one of theſe the ſilky hairs were entirely ruſſet, ſo that the back appeared of the ſame tint as the ſides and the belly; in another, the dorſal ſtripe, inſtead of being cheſnut, had paſſed entirely to a red colour, the flanks being of a very pale red. He could not believe that theſe varieties, on the one hand, were the character of youth or of the female, becauſe theſe accidents were rare, conſidering the great number of ſkins which he examined; and, on the other, becauſe M. d'Azzara has expreſsly told us that the female is entirely ſimilar to the male.

Molina and d'Azzara agree in regard to the mild qualities by which the coypou is diſtinguiſhed. It eats every thing given to it. It may be eaſily tamed, and ſoon becomes accuſtomed to the ſtate of domeſticity. It is never heard to cry but when harſhly uſed; it then emits a piercing cry. The female produces five young, which ſhe always carries with her.

The coypou is very common in the provinces of Chili, Buenos Ayres, and Tucuman. On the other hand, it is rarely found in Paraguay.

123 Arctomys.

Genus 31. ARCTOMYS. *MARMOTS.*

Front teeth two in each jaw, ſtrong, ſharp, and wedged. Grinders in the upper jaw five on each ſide; in the lower jaw four. Clavicles or collar bones in the ſkeleton.

This genus differs in very few particulars from that of *mus*. The marmots are of a thick form, with large, roundiſh, and ſomewhat flattened heads, ſmall mouths, the fiſſure having ſomewhat of a perpendicular appearance; ears very ſhort, and ſometimes none; a ſhort villous tail, and five-toed hind feet: the ſkeleton is furniſhed with clavicles or collar-bones, and the cœcum or appendicular inteſtine is very large. They are diurnal animals; feed on roots, and grain, reſide in ſubterraneous holes or burrows, and ſleep during the winter.

There are eight ſpecies, viz.

1. *A. Marmota*, Alpine M. Brown, reddiſh beneath.—2. *A. Monax*, Maryland M. Ruſty brown, with bluiſh gray ſnout, and longiſh villous tail.—3. *A. Empetra*, Quebec M. Gray, waved with darker and lighter ſhades, reddiſh below, with duſky tail.—4. *A. Bobac*, Bobac. Gray, reddiſh below, with a thumb claw on the fore feet.—5. *A. Pruinoſa*, Hoary M. Hoary, with black ears and tail.—6. *A. Maulina*, Mauline M. Tail of middling length; ears ſharp-pointed, and feet five-toed.—7. *A. Gundi*, Gundi M. Reddiſh, with [illegible] ears.—8. *A. Citillus*, Variegated M. Reddiſh, with villous tail.

1. *A. Marmota*, Alpine M.—This animal is rather larger than a rabbit, being about 16 inches long, excluſive of the tail, which meaſures about 6 inches. Its head is rather large and flattiſh; the ears ſhort and hidden in the fur, and the tail thick and buſhy.

History of the Species.

124 *Marmota*, Alpine Marmot. Fig. 56.

It is a native of the Alps and Pyrenees, being moſt frequently found in Savoy and Switzerland, where it inhabits the higher regions, and feeds on various roots, plants, inſects, &c. It climbs readily, and aſcends with eaſe the rocky eminences and fiſſures.

It is an animal which delights in the regions of high mountains. In ſuch ſituations ſeveral individuals unite in forming a place of retreat, which is contrived with great art, and conſiſts of an oval cavity or general receptacle, large enough to contain ſeveral of the animals, and having a large canal or paſſage, which divaricates in ſuch a manner as to preſent two outlets to the ſurface of the ground. Theſe receſſes are prepared on the declivity of elevated ſpots; and the cavern or receptacle is well lined with moſs and hay, which they prepare during ſummer, as if conſcious of the neceſſity of providing for their long hybernal ſleep. In fine weather they are ſeen ſporting about the neighbourhood of their burrows, and delight in baſking in the ſunſhine, frequently aſſuming an upright poſture, ſitting on their hind feet. When aſſembled in this manner, it is obſerved, that one of the exterior number ſeems to act as a ſentinel; and, on the approach of any danger, alarms the fraternity by a loud and ſhrill whiſtle, on which they inſtantly retire to their cavern. Theſe animals make no proviſion for winter; but as ſoon as the autumnal froſts commence, they carefully ſtop up the entrances to their manſions, and gradually fall into a ſtate of torpidity, in which they continue till the arrival of ſpring, when they again awake, and recommence their excurſions. Before they retire to their winter quarters they are obſerved to grow exceſſively fat; and, on the contrary, appear greatly emaciated on firſt emerging from them. If carefully dug up during the winter, from their holes, they may be conveyed away in their ſleeping ſtate; and when brought into a warm chamber, gradually awaken, nearly in the ſame manner as the hamſter. If kept in a warm ſituation, they do not become torpid in winter. They breed early in ſummer, and the litter commonly conſiſts of three or four, the growth of which is obſerved to be very rapid.

When taken young, the marmot may be eaſily tamed, and is often taught to perform various geſticulations. In a domeſtic ſtate it will alſo eat almoſt any kind of animal or vegetable food, and is extremely fond of milk. In feeding it generally ſits in an upright poſition, making uſe of its paws in the manner of a ſquirrel.

125 Sciurus.

Genus 32. SCIURUS. *SQUIRRELS.*

Upper front teeth wedged; lower ſharp. Upper grinders five on each ſide, lower four. Clavicles. Tail in moſt ſpecies ſpreading towards each ſide.

The beautiful animals which compoſe this genus are remarkable for the livelineſs of their diſpoſition, the rapidity of their movements, and the general neatneſs and elegance of their appearance. A few of the ſpecies are furniſhed with an expanſile lateral ſkin, ſimilar to that in the calugo, by means of which they are enabled to ſpring to a great diſtance, and to ſupport themſelves occaſionally from tree to tree. Like the calugo, they are-not, however, continue this motion, and are therefore improperly called *flying ſquirrels*. The ſquirrels inhabit woods, and prepare their neſts in hollow trees. They live entirely on vegetable food.

There are 26 ſpecies, viz.

A. *Not ſtriped.*

1. S. *Maximus*, Great S. Ruſty, yellowiſh below, with the outſides of the limbs and tail black.—2. *S. Madagaſcarienſis*, Madagaſcar S. Black, with the noſe, ears, and under parts yellowiſh white, and very long tapering tail.—3. *S. Macrourus*, Long-tailed S. Dark brown, yellowiſh white below, with the tail twice the length of the body.—4. *S. Bicolor*, Javan S. Blackiſh, fulvous below, with pointed beardleſs ears, and large rounded thumb claw.—5. *S. Anomalus*, Georgian S. Duſky ruſty, with tail and lower parts fulvous, and rounded beardleſs ears.—6. *S. Erythræus*, Ruddy S. Yellowiſh brown, with the under parts and tail red ruſty, and ciliated ears.—7. *S. Indicus*, Bombay S. Purple brown; yellow below; tip of the tail orange-coloured.—8. * *S. Vulgaris*, Common S. Reddiſh brown, white below, with pencilled ears.—9. *S. Cinereus*, Gray S. Aſh-coloured, white below, with beardleſs ears.—10. *S. Niger*, Black S. Black, with beardleſs ears.—11. *S. Hudſonius*, Hudſon's Bay S. Iron gray, daſhed with ruſty, whitiſh below, with duſky ſide-ſtripe, and lance-ſhaped tail edged with black.—12. *S. Perſicus*, Perſian S. Duſky, yellow below, with white ſides, beardleſs ears, and blackiſh gray tail, with a white band.—13. *S. Flavus*, Fair S. Yellow, with roundiſh ears and five-toed feet.—14. *S. Æſtuans*, Braſilian S. Duſky; yellow below, with longitudinal white ſtripe in the middle.

B. *Striped or variegated.*

15. *S. Variegatus*, Coquallin S. Ruſtyiſh, orange-tawny below, with the upper parts varied croſswiſe with black, brown, and whitiſh.—16. *S. Mexicanus*, Mexican S. Aſh brown, with five or ſeven longitudinal white ſtripes.—17. *S. Getulus*, Barbary S. Brown, with four longitudinal white ſtripes.—18. *S. Palmarum*, Palm S. Brown, pale below, marked above with three longitudinal yellowiſh ſtripes, and the tail with blackiſh ones.—19. *S. Ginginianus*, Gingi S. Gray brown, with a longitudinal white ſtripe on each ſide, and blackiſh tail.—20. *S. Degus*, Chilian S. Yellowiſh brown, with a black ſtripe on each ſhoulder.—21. *S. Striatus*, Striped S. Yellowiſh brown, with five longitudinal blackiſh ſtripes.

C. *Flying Squirrels.*

22. *S. Volans*, Common-flying S. Pale gray, white below, with the ſide ſkin dilated into a flying membrane.—23. *S. Volucella*, Virginian flying S. Brown, yellowiſh white below, with a flying membrane.—24. *S. Sabrinus*, Severn flying S. Ruſty brown, yellowiſh white below, with flattiſh villous tail.—25. *S. Sagitta?* Hooded flying S. Ruſty brown, pale ruſty below, with the flying membrane commencing on each ſide of the head.—26. *S. Petauriſta*, Taguan S. Cheſnut-coloured; pale ruſty beneath, with very long, round, tapering, villous tail.

126 *Vulgaris*, Common Squirrel. Fig. 7.

8. *S. Vulgaris*, Common Squirrel.—The tail of this ſpecies is long enough to cover the whole body, and is covered with long hairs, diſpoſed on each ſide horizontally, which gives it a great breadth. Theſe ſerve a double purpoſe. When erected, they prove a ſecure protection from the injuries of heat or cold: When extended, they are very inſtrumental in promoting thoſe vaſt leaps the ſquirrel takes from tree to tree. On the authority of Klein and Linnæus, we may add a third application of the form of the tail. Theſe naturaliſts tell us, that when the ſquirrel is diſpoſed to croſs a river, a piece of bark is the boat, the tail the ſail.

Glires.

This animal is remarkably neat, lively, active, and provident, never leaves its food to chance, but ſecures in ſome hollow tree a vaſt magazine of nuts for winter proviſion. In the ſummer it feeds on the buds and young ſhoots, and is particularly fond of thoſe of the fir and pine, and alſo of the young cones. It makes its neſt of moſs or dry leaves, between the fork of two branches, and brings forth four or five young at a time. Squirrels are in heat early in the ſpring, when it is very diverting to ſee the female feigning an eſcape from the purſuit of two or three males, to obſerve the various proofs they give of their agility, which is then exerted in full force.

The colour of the whole head, body, tail, and legs of this animal, is a bright reddiſh brown: the belly and breaſt white. In ſome parts of Wales there is a variety of the ſquirrel kind, with a cream-coloured tail. The ears are very beautifully ornamented with long tufts of hair, of a deeper colour than thoſe of the body. The eyes are large, black, and lively. The fore teeth ſtrong, ſharp, and well adapted to its food. The legs are ſhort and muſcular; the toes long and divided to their origin: the nails ſtrong and ſharp; in ſhort, in all reſpects fitted for climbing, or clinging to the ſmalleſt boughs. On the fore feet it has only four toes, with a claw in the place of the thumb or interior toe: on the hind feet there are five toes. When it eats or dreſſes itſelf, it ſits erect, covering the body with its tail, and making uſe of the fore legs as hands. It is obſerved that the gullet of this animal is very narrow, to prevent it from diſgorging its food, in deſcending of trees, or in down leaps.

In northern climates theſe animals change their colour to gray on the approach of winter; and it is ſingular that this change will take place, even though they are kept in the warmth of a ſtove.

127 Myoxus.

Genus 33. MYOXUS. *DORMICE.*

Front teeth two; upper wedged, lower compreſſed. Grinders four in each jaw. Whiſkers long. Tail cylindric, villous, thicker towards the end. Legs of equal length; fore feet four-toed.

There are ſeven ſpecies, viz.

1. *M. Glis*, Fat D. Gray, whitiſh below.—2. *M. Nitela*, Garden D. Rufous, grayiſh white below, with a black mark above the eyes and behind the ears.—3. *M. Dryas*, Wood D. Grayiſh rufous, whitiſh below, with a ſtraight black ſtripe acroſs the eyes to the ears.—4. * *M. Muſcardinus*, Common D. Rufous, with whitiſh throat, and the thumbs of the hind feet without claws.—5. *M. Chryſurus*, Gilt-tailed D. Purpliſh brown, with the hind part of the tail and longitudinal ſtripe on the head gold yellow.—6. *M. Guerlinguus*, Guerlinguet D. Ruſty, yellowiſh rufous beneath,

with long rather depreſſed tapering tail.—3. *M. Africanus*, African D. Rusty gray, whitiſh below, with a white [illegible] and black line; tail black in the middle, and [illegible] on the [illegible] very long.

128 [illegible]

4. *M. Muſcardinus*, Common D.—The ſize of the dormouſe is equal to that of a mouſe, but has a plumper appearance, and the noſe is blunter; the eyes are large, black, and prominent; the ears broad, rounded, thin, and ſemitranſparent. The fore feet are furniſhed with four toes, the hind feet with five; but the interior toes of the hind feet are deſtitute of nails. The tail is about two inches and a half long, covered on every ſide with hair: the head, back, ſides, belly, and tail, are of a tawny red colour; the throat white.

Theſe animals ſeldom appear far from their retreats, or in any open place, for which reaſon they ſeem leſs common in England than they really are. They make their neſts of graſs, moſs, and dead leaves, and uſually bring forth three or four young at a time.

This animal agrees with the ſquirrel with reſpect to its food, reſidence, and in many of its actions; but it wants much of the ſprightlineſs of this animal, never aſpiring to the tops of trees, nor, like it, attempting to bound from ſpray to ſpray. Like the ſquirrel, it forms little magazines of nuts for winter proviſion, takes its food in the ſame manner, and ſame upright poſture. The conſumption during the rigour of the ſeaſon is but ſmall, for it ſleeps moſt part of the time, retiring into its hole at the firſt approach of the winter, where it lies torpid for the greateſt part of that gloomy ſeaſon. In that ſpace it ſometimes experiences a ſhort revival, in a warm ſunny day, when it takes a little food, and then relapſes into its former ſtate.

Genus 34. Dipus. *Jerboa.*

Front teeth two both above and below. Fore legs very ſhort; hind legs very long. Clavicles.

129 Dipus.

There are ſix ſpecies, viz.

1. *D. Sagitta*, Common Jerboa.—Pale brown, white beneath, with extremely long three-toed hind feet, and very long tail, with ſubpinnated black and white tip.—2. *D. Jaculus*, Alaglaga J. Pale brown; white below, with extremely long five-toed hind feet, and very long tail, with ſubpinnated black and white tip.—3. *D. Caſer*, Cape J. Rusty, pale aſh-coloured below, with five-toed fore feet, four-toed hind feet, and very villous tail, tipped with black.—4. *D. Meridianus*, Torrid J. Yellowiſh brown, white below, with about four toes on the fore feet and five-toed hind feet, and tapering tail.—5. *D. Tamaricinus*, Tamariſk J. Yellowiſh brown; white below, with about four toes on the fore feet, five-toed hind feet, and tapering tail obſcurely ringed with brown.—6. *D. Canadenſis*, Canadian J. Yellowiſh brown, whitiſh below, with four-toed fore feet; five-toed hind feet, the tail long and mouſe-like.

130 [illegible]

1. *D. Sagitta*, Common J.—This animal appears to have been known to the ancients, under the name of *μυς διπους*, or two-footed mouſe, and is repreſented, though not very correctly on ſome coins of Cyrene, where it is found in great abundance. By ſome it is ſuppoſed to be the *ſaphan* of the ſacred writings (in our tranſlation rendered *coney*), though this is denied by Mr Bruce. It is found in Egypt, Barbary, Paleſtine, in the deſerts between Baſſora and Aleppo; the ſandy [illegible] tracts between the Don and Volga, and ſome other parts of Aſia. M. Sonnini has given a long account of it, as he found it in Egypt, and from this we ſhall extract the following deſcription.

"Its ſize is nearly equal to that of a large rat. Its head is broad, large in proportion to the body, the upper part flat, and of a light-fawn colour, ſtriped with black; the upper jaw projects beyond the lower: they are both provided with two cutting teeth; the upper ones broad, ſquare, flat, and divided longitudinally by a groove in the middle; the lower ones longer, convex externally, pointed at their extremity, and bent inwards. The muzzle is ſhort, wide, and obtuſe; a number of ſtiff hairs grow out on each ſide, and form long whiſkers. The noſe is white, bare, and cartilaginous. The iris of its large and projecting eye is brown; the ears long, large, and covered with hair, ſo ſhort that they appear naked except on very cloſe inſpection; externally they are white in the lower part, and gray upwards: their middle, as well as the ſides of the head, is of a very light-fawn colour, mixed with gray and black: they entirely ſurround the meatus auditorius for about one-third of their length, ſo that they exactly reſemble the larger end of a cone. This conformation muſt increaſe the animal's faculty of hearing, and is particularly well calculated to defend the inner part of the organ from the extraneous ſubſtances that might lodge there. The body is ſhort, well provided with long, ſoft, ſilky hair; that which covers the back and ſides is of an aſh colour throughout almoſt the whole of its length, and of a light fawn colour where it approaches the points, which are black; but as the aſh-coloured part is not viſible, it may be ſaid that the fur is fawn-coloured, with blackiſh zigzag ſtripes. Theſe tints, which are ſomewhat duſky, form an agreeable contraſt with the fine white of the belly. The fore legs are ſo ſhort that they ſcarcely extend beyond the hair: they are white, and have five toes, the inner of which is ſhort, rounded at the end, and has no nail. The four other toes, the ſecond outer one of which is the longeſt, are long, and armed with great hooked nails; the heel is very high, and the middle of the foot is naked and of a fleſh colour. Theſe fore feet are of no uſe to the animal in walking, but ſerve him only to lay hold of his food, and to carry it to his mouth, as alſo to dig his ſubterraneous abode. The hind legs are covered with long hair, fawn-coloured and white; its long feet are almoſt entirely bare, eſpecially on the outſide, which muſt neceſſarily be the caſe, ſince the animal, whether in motion or at reſt, conſtantly leans on that part. Thoſe feet, ſo exceedingly long, have each three toes; the middle one ſomething longer than the other two: they are all provided with nails, which are ſhort, but broad and obtuſe; they have alſo at the heel a kind of ſpur, or rather a very ſmall rudiment of a fourth toe, which gives the jerboa of Egypt ſome reſemblance to the alagtaga of Tartary, deſcribed by Gmelin in the Peterſburgh Tranſactions, and which part probably eſcaped Haſſelquiſt, as well as many others. The toes and the heel are furniſhed below with long gray hairs tinged with yellow, except that at the origin of the toes, which is of a blackiſh caſt; the nails, both of the fore and hind feet, are of a dirty white. According to Haſſelquiſt the tail of the jerboa is [illegible] the length of the body. I never, ſays Sonnini, found it much more than half that length. It ſcarcely exceeds the circumference of a gooſe quill, but is of a quadrangular and not a round ſhape. It is of a deeper gray above than below, and is furniſhed with ſhort hairs as far as the extremity, which ends in a tuft of long ſilky hair, half black and half gray *."

This animal is as ſingular in its motions as in its form. It always ſtands erect on its hind feet, the fore feet performing the office of hands. It runs faſt, and, when purſued, jumps five or ſix feet from the ground; burrows like rabbits; keeps cloſe in the day; ſleeps [illegible] lively during night: when taken, emits a plaintive feeble note; feeds on vegetables, and has great ſtrength in its fore feet. Two which Mr Pennant ſaw living in London, burrowed almoſt through the brick wall of the room they were in, came out of their hole at night for food, and, when caught, were much fatter and ſleeker than when confined to their box.

The jerboa is eaſily tamed. M. Sonnini kept ſix of them for ſome time in a large iron cage, but found it was very difficult to preſerve them, owing to their great tenderneſs.

Genus 35. Lepus. *Hares and Rabbits.*

Front teeth two in each jaw, the upper pair duplicate; two ſmall inner teeth ſtanding behind the outer.

This genus approaches very nearly to the order of Pecora, and it has even been ſuppoſed that the common hare actually ruminates; an opinion which is owing not merely to the peculiar motions of its mouth, ſimilar to thoſe in ruminating animals, but to the ſtructure of the ſtomach, which appears to be divided into two regions by a particular fold. All the ſpecies are herbivorous.

There are 12 ſpecies, viz.

1. * *L. Timidus*, Common H. Ruſtyiſh brown, ſhort-tailed, with ears longer than the head and tipped with black.—2. * *L. Variabilis*, Varying H. Tawny-gray, ſhort-tailed, (white in winter) with ears ſhorter than the head, and tipped with black.—3. *L. Americanus*, American H. Tawny-gray, ſhort-tailed, white below, with the hind legs longer than the body, and the ears and tail tipped with gray.—4. *L. Tolai*, Baikal H. Pale brown, ſhort-tailed, with the upper edges of the ears black.—5. * *L. Cuniculus*, Rabbit. Short-tailed, brown, with the tips of the ears black, and the hind legs ſhorter than the body.—6. *L. Brazilienſis*, Brazilian H. Tailleſs, brown, white below, with a white collar round the neck.—7. *L. Capenſis*, Cape H. Brown, with reddiſh legs, and tail the length of the head.—8. *L. Viſaccia*, Viſaccia. Browniſh, with long briſtly tail.—9. *L. Alpinus*, Alpine H. Tailleſs, ruſty, with rounded ears, and browniſh feet.—10. *L. Ogotana*, Ogotona H. Tailleſs, pale brown, with oval [illegible] ears of the ſame colour.—10. *L. Puſillus*, Calling H. Tailleſs, gray-brown, with nearly triangular ears edged with white.—12. *L. Minimus*, Minute H. Short-tailed, brown, long-noſed, with ſmall hairy pointed ears.

1. *L. Timidus*, Common H.—To deſcribe an animal ſo well known would be ſuperfluous; we may only remark, that nature, ever kind and provident, in pity to its defenceleſs ſtate againſt its numerous enemies, has beſtowed on it many faculties, by which it is frequently enabled to evade their purſuit. Fearful of every danger, and attentive to every alarm, the hare is continually upon the watch, and being provided with very long ears, moveable at pleaſure, and eaſily directed to every quarter, is warned of the moſt diſtant approaches of danger. Its eyes are large and prominent, adapted to receive the rays of light on every ſide, and give notice of more immediate alarms. To theſe may be added its great ſwiftneſs, by which it ſoon leaves moſt of its purſuers far behind.—The hind are much longer than the fore legs, and are furniſhed with ſtrong muſcles, which give the hare a ſingular advantage in running up a hill; and, as if ſenſible of its powers in this reſpect, it is always obſerved to fly towards riſing ground when firſt ſtarted.

Glires.

Thus formed for eſcape, the hare might be ſuppoſed to enjoy a ſtate of tolerable ſecurity; but as every rapacious creature is its enemy, it is ſeldom permitted to live out its natural term. Dogs and foxes purſue it by inſtinct; wild cats and weaſels of all kinds, catch and devour it; birds of prey are ſtill more dangerous enemies, whilſt man, far more powerful than all, makes uſe of every artifice to obtain an animal which conſtitutes one of the numerous delicacies of his table. If we were to enumerate the various ſtratagems which ingenuity has ſuggeſted to circumvent this perſecuted creature, we would willingly omit the notable atchievements and gallant exploits of the chaſe, which, to a cool and diſpaſſionate obſerver, ſeem to demand a nobler game. This animal has alſo another means of ſafety from her colour very much reſembling that of the ground where ſhe ſits. In the colder regions ſhe is ſaid to become white during the winter, when the ground is covered with ſnow.

The hare is very prolific, breeds four or five times in the year, goes with young 30 days, and generally produces three or four at a litter. They are firſt in heat about February. Hares generally keep within their ſeats during the day, going out only at night in ſearch of food, and they always return to their forms by the ſame paths by which they left them.

The following inſtances of the ſagacity of the hare, in endeavouring to eſcape from its enemies, are quoted by Mr Bewick. Touilloux ſays, he has ſeen a hare ſtart from its form at the ſound of the hunter's horn, run towards a pool of water at a conſiderable diſtance, plunge itſelf in, and ſwim to ſome ruſhes in the middle, where it lay down, and concealed itſelf from the purſuit of the dogs. He mentions another, which, after running two hours before the dogs, puſhed a hare from its ſeat, and took poſſeſſion of it. Others he has ſeen run into a ſheepfold, and lie down among the ſheep; and ſome have effected their eſcape by mounting an old wall, and clapping themſelves down in the midſt of the ivy which covered it.

The hare has been ſometimes tamed, and rendered very familiar. When Dr Townſon was at Gottingen, he had a young hare that became ſo frolicſome in the evenings, as to run about upon the ſofa and bed, ſit upon its hind legs, and pat him with its fore feet; and, while he was reading, it would even knock the book out of his hand. Mr Borlaſe ſaw a hare that was ſo familiar as to feed from the hand, lay under a chair in a common ſitting room, and appeared, in every other re-

Glires. ſpect, as eaſy and comfortable in its ſituation as a lapdog. It now and then went out into the garden; but after regaling itſelf, always returned to the houſe as its proper habitation. Its uſual companions were a greyhound and a ſpaniel, both ſo fond of hare-hunting, that they often went out together without any perſon accompanying them. With theſe two dogs this tame hare ſpent its evenings: they always ſlept on the ſame hearth, and very frequently it would reſt itſelf upon them.

The fur of the hare is uſed for hats; and for this purpoſe many thouſands of their ſkins are imported into this country from Ruſſia, beſides what are collected here.

133 Cuniculus, Rabbit. 5. *L. Cuniculus*, the Rabbit.—Reſpecting an animal ſo well known as the rabbit, we ſhall remark only, that its fecundity is truly aſtoniſhing. It breeds ſeven times in the year, and generally produces eight young at a time. Hence it is calculated, that the produce of a ſingle pair may, in the courſe of four years, amount to the amazing number of 1,274,840, ſo that if frequent reductions were not made by various ways, there is reaſon to apprehend that they would ſoon exceed the means of their ſupport, and overrun the face of the country. They are, however, expoſed to numerous enemies. Beſides the havock made among them by man for their fleſh and ſkins, which latter are alſo uſed in the manufacture of hats, they are the prey of foxes, weaſels, polecats, and other beaſts of prey.

The rabbit is often kept in a domeſtic ſtate; but the fleſh of the domeſtic rabbit is far inferior to that of the wild animal.

134 Hyrax.

Genus 36. HYRAX. *Hyrax, or Daman.*

Front teeth in the upper jaw two, broad, and rather diſtant; in the lower four, broad, flat, twice notched. Grinders four on each ſide in both jaws, large. Fore feet four-toed; hind feet three-toed. No tail or clavicles.

There are three ſpecies, viz.

1. *H. Capenſis*, Cape H. Gray brown, paler below, with flat nails on the fore feet, and a ſingle ſharp crooked claw on the hind feet.—2. *H. Syriacus*, Syrian H. Reddiſh gray, white below, with three-toed feet, and nearly equal claws.—3. *H. Hudſonius*, Hudſon's bay H. Aſh brown, with the hair whitiſh at the tips, and all the feet four-toed.

A long account is given of the ſecond ſpecies in Mr Bruce's Travels to Abyſſinia. Mr Bruce calls it *aſkoko*, and ſuppoſes it to be the ſaphan or coney of the ſacred writings. For his deſcription we muſt refer to the work itſelf.

This order contains 11 genera and 124 ſpecies.

CHAP. V. PECORA.

[illegible]

Genus 37. CAMELUS. *Camel.*

Horns wanting. Front teeth in the lower jaw ſix; rather thin and broad. Canine teeth diſtant, three in the upper jaw, two in the lower. Upper lip divided.

There are uſually enumerated ſeven ſpecies, viz.

1. *C. Dromedarius*, Arabian C. With a ſingle bunch on the back.—2. *C. Bactrianus*, Bactrian C. With two bunches on the back.—3. *C. Glama*, Glama. Pale rusty, whitiſh below, with level back and pectoral bunch.—4. *C. Vicugna*, Vicuna. Purpliſh brown, whitiſh below, with level woolly back, blunt ſnout, and upright tail.—5. *C. Paco*, Paco. Purpliſh brown, woolly, white below, with oblong ſnout.—6. *C. Huanacus*, Guanaco. Tawny, white below, with gibbous back, and upright tail.—7. *C. Arcuranus*, Chilihuque. With ſmooth woolly body, curved ſnout, and pendulous ears and tail.

136 Dromedary, or Arabian Camel. Fig. 2. 1. *C. Dromedarius*, Arabian Camel. Dromedary. A ſingle bunch on the back.—This ſpecies is thus deſcribed by Dr Shaw.

The general height of the Arabian camel, meaſured from the top of the dorſal bunch to the ground, is about ſix feet and a half; but from the top of the head, when the animal elevates it, not leſs than nine feet. The head, however, is generally ſo carried as to be nearly on a level with the bunch, or rather below it, the animal bending the neck extremely in its general poſture. The head is ſmall; the neck very long: the body of a long and meagre ſhape; the legs rather ſlender, and the tail, which is ſlightly tufted at the end, reaches to the joints of the hind legs. The feet are very large, and are hoofed in a peculiar ſtyle, being divided into two lobes not reaching through the whole length of the foot; and the extremity of each lobe is guarded by a ſmall hoof. The under part of the foot is covered with an extremely ſtrong, tough, and pliable ſkin, which, by yielding in all directions, enables the animal to travel with peculiar eaſe and ſecurity, over dry, ſtony, and ſandy regions. On each leg are ſix callosities, viz. one on each knee, one on the inſide of each fore leg on the upper joint, and one on the inſide of each hind leg at the bottom of the thigh. On the lower part of the breaſt is alſo a large callus or tough tubercle (G).

The camel is generally of a duſky-brown colour, with a reddiſh tinge.

Its hair is very fine and ſoft, and is employed in making pencils for painters, and in the manufacture of various ſtuffs.

This

(G) It was formerly ſuppoſed that, beſides the four ſtomachs common to all ruminating animals, the camel had a ſort of fifth ſtomach or appendage to the ſecond ſtomach, calculated for receiving a large quantity of water to ſupply the animal in his long journeys over the deſerts. There is no ſuch receptacle: but in the firſt, and more eſpecially the ſecond ſtomach, there are ſeveral rows of cells, furniſhed round their edges with ſtrong muſcular fibres, by which they can be cloſed at pleaſure. Into theſe cells part of the water which the camel drinks is, by a peculiar mechaniſm, received, and retained, in a pure ſtate, till the animal has occaſion for it. In an intereſting paper on this ſubject in the Philoſophical Tranſactions for 1806, Mr Home has given a comparative view of the ſtructure of the ſtomachs in the ox and the camel, illuſtrated by plates.

This animal attains its full ſtrength at about the age of ſix years, and lives about 40 years, or ſometimes 50. Only the males are uſually employed for labour; the females being kept for breeding, and ſuffered to range at liberty. Theſe go with young about 12 months, and uſually bring forth one at a time.

The camel is found wild in the deſerts of Arabia, in Africa, and in moſt of the temperate parts of Aſia. It is domeſticated chiefly among the Arabs, of whom it forms the principal riches.

We are chiefly acquainted with this animal in a ſtate of domeſtication; and to this ſtate only the accounts that have been given of him are applicable. A few days after birth the legs of the young camels are folded up below their belly, and they are conſtrained to remain in this poſition on the ground, and are loaded with a pretty heavy weight, which is never taken off but to replace it by a greater. Inſtead of allowing them to feed and drink at pleaſure, they begin by regulating their repaſts, and increaſing the intervals between them, and diminiſhing the quantity of their nouriſhment. When they have acquired a little more ſtrength, they are exerciſed in running, in which they are excited to emulation by the example of horſes; and thus in time they become both robuſt and active.

Thus inſtructed, the camels traverſe with great rapidity the immenſe deſerts of Arabia, marching night and day almoſt without ſtopping, and almoſt without taking food or drink. They are often made with apparent eaſe to travel 300 leagues in eight days; and during the whole of this time they are allowed but one hour of the day for repoſe, and for nouriſhment: often they will run for even nine or ten days without finding water; but when they happen to find water at ſome diſtance in their route, if permitted, they eagerly make towards it, and are ſaid to ſcent it at more than half a league's diſtance.

The march of camels acroſs the ſandy plains of Arabia has been elegantly deſcribed by Buffon. "Figure to yourſelf (ſays this animated writer) a country without verdure and without water, a burning ſun, an air always parched, ſandy plains, mountains ſtill more aduſt, which the eye runs over without perceiving an animated being; a dead earth perpetually toſſed with the wind, and preſenting nothing but bones, ſcattered flints, rocks perpendicular or overturned; a deſart totally void, where the traveller never breathes under a ſhade, where nothing accompanies him, nothing recals the idea of animated nature; abſolute ſolitude, more dreadful than that of the deepeſt foreſts: more ſolitatary and naked, more loſt in an unlimited wild, he every where beholds ſpace ſurrounding him like a tomb; the light of day, more diſmal than the darkneſs of night, ſerves only to give him a clear idea of his own wretchedneſs and impotence, and to conceal from his view the boundaries of the void, by extending around him that immenſe abyſs, which ſeparates him from the habitable parts of the earth.

"The Arab, however, by the aſſiſtance of his camel, has learned to ſurmount, and even to appropriate theſe frightful intervals of nature. They ſerve him for an aſylum, they ſecure his repoſe, and maintain his independance; but man never uſes any thing without abuſe. This ſame free, independent, tranquil, and even rich Arab, inſtead of regarding his deſerts as the ramparts of his liberty, pollutes them with his crimes; he traverſes them to carry off goods and ſlaves from the adjacent nations; he employs them for perpetrating his robberies, which unluckily he enjoys more than his liberty, for his enterpriſes are almoſt always ſucceſsful; notwithſtanding the vigilance of his neighbours and the ſuperiority of their ſtrength, he carries off with impunity all that he raviſhes from them. An Arab who gives himſelf up to this kind of land piracy, is early accuſtomed to the fatigues of travelling, to want of ſleep, and to hunger, thirſt, and heat, and with the ſame view he uſes and inſtructs his camels. After he is certain of the ſtrength, fleetneſs, and ſobriety of his camels, he loads them both with his own and their food, ſets off with them, arrives unperceived at the confines of the deſert, robs the firſt paſſenger he meets, pillages the ſolitary houſes, loads his camels with the booty; and, if purſued, he is obliged to accelerate his retreat. It is on theſe occaſions, that he unfolds his own talents and thoſe of the camels; he mounts one of the fleeteſt, and conducts the troop, and makes them travel night and day, without almoſt either ſtopping, eating, or drinking; and in this manner he eaſily performs a journey of 300 leagues in eight days. During this period of motion and fatigue his camels are perpetually loaded."

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In Turkey, Perſia, Arabia, Egypt, and Barbary, the only means of tranſporting merchandiſe is by camels, as this is of all others the cheapeſt and moſt expeditious method. The merchants and other travellers unite in a caravan, in order to avoid the inſults, piracies, and robberies of the Arabs. Theſe caravans always conſiſt of a greater number of camels than of men; each of theſe animals is loaded according to his ſtrength, and he ſo well knows the proper extent of his load, that when he is overloaded, he utters the moſt lamentable cries, and continues lying down till his burden is lightened. The large camels uſually carry 10 or even 12 hundred weight, and the ſmaller 6 or 7 hundred weight.

In theſe commercial journeys they never hurry the camels in their march, but regulate their days work; they generally go a certain ſpace, and travel about 10 or 12 leagues every day; every evening their load is taken off, and they are ſuffered to feed at liberty. If they are in a country abounding with herbage, they uſually eat as much in an hour as is ſufficient to ſerve them for the next twenty-four hours; and, during the remainder of the night, they continue to ruminate: but they ſeldom find ſuch good paſturage; and indeed this delicate nouriſhment does not appear to be neceſſary for them; they even ſeem to prefer wormwood, thiſtles, nettles, broom, caſſia, and other prickly plants, to more pleaſant herbage. So long as they find plants to browſe, they eaſily go without drink.

Nothing is more admirable than their docility. At the firſt ſign they bow their knees and crouch to the earth to ſuffer themſelves to be loaded in this ſituation, and, when loaded, they riſe of their own accord without aſſiſtance. They follow exactly the motions of their conductor, and require neither whip nor ſpur to urge them forward; but, when they begin to be fatigued, their maſters ſupport their ſpirit, or rather beguile their fatigue, by ſinging or by the ſound of muſical inſtruments. When they wiſh to prolong their journey, they give them

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them only an hour for repoſe; and then retaining their ſong, they continue the march for ſeveral hours longer, and give over ſinging only when they intend to ſtop; then the camels crouch again with their burdens, from which they are freed by looſening the cords and faſtenings on each ſide, while the poor animals remain kneeling on the earth, and ſleep in this poſture in the midſt of their baggage. Mr Pennant and ſome other writers tell us, that camels are made to go more expeditiouſly by being whiſtled to by the drivers; but this is at leaſt not an univerſal practice, as we are told by Sonnini, that the Bedouin Arabs, who poſſeſs great numbers of camels, not only never uſe whiſtling themſelves, but expreſs much uneaſineſs when they hear others whiſtle.

When the caravan on theſe long journeys acroſs the deſerts find themſelves in want of water, and have no other means of procuring it, it is not uncommon for them to kill a camel for the ſake of the water contained in his ſtomach, which is ſaid to be always ſweet and pleaſant.

This animal, ſo patient, and ſo obedient to the voice of man, has, however, his periodical fits of rage, at which he becomes wholly unmanageable. Theſe fits take place at the rutting ſeaſon, which happens every year about ſpring, and continues about 40 days. At theſe times they are quite outrageous, eat little, foam at the mouth, and bite at other animals, and even their maſters; and they have been known to take up a man in their teeth, throw him on the ground, and trample him under their feet. Though ſo remarkably docile, except during the rutting ſeaſon, they are, however, abundantly ſenſible of injuſtice and ill treatment; and, when they experience theſe, they ſeldom fail to ſhew their reſentment, and endeavour to wreak their vengeance on their unfeeling driver, who will not find it eaſy to eſcape their vengeance, as they are ſaid to retain for a long time the remembrance of an injury. Though eager to expreſs their reſentment, they ſeem incapable of harbouring any rancour, when they are once ſatisfied; and it is ſufficient to make them believe that they have taken their deſired vengeance on their perſecutor. Whenever the Arab finds that he has excited the rage of his camel, as he well knows that the animal will take the firſt opportunity of ſeeking revenge, he lays down his clothes in a ſituation which the animal is to paſs, and arranges them in ſuch a manner as to ſeem as if he himſelf were lying there. The camel recogniſes the clothes, ſeizes them in his teeth, ſhakes them violently, and tramples them under his feet; but when his rage has been thus ſatisfied, he leaves them, and after this his owner may approach, load, and guide him as uſual. M. Sonnini ſays, that he has ſometimes ſeen them, when weary with the impatience of their riders, ſtop ſhort, turn round their long necks to bite them, and utter cries of rage. Under theſe circumſtances the rider muſt be careful not to diſmount, or he would infallibly be torn to pieces; and he muſt alſo beware ſtriking the beaſt, as that would only increaſe his fury. Nothing can be done but to wait with patience, and endeavour to appeaſe the animal by patting him with the hand. When once appeaſed, which ſometimes is not ſpeedily done, the camel can proceed on his journey at his uſual pace.

Genus 35. Moschus, Muſk.

Horns wanting; front teeth eight in the under jaw; tuſks ſolitary in the upper jaw, exſerted.

There are 7 ſpecies, viz. 1. *M. Moſchiferus*, Tibetian Muſk. Gray-brown, with umbilical follicle. —2. *M. Indicus*, Indian M. Rufous, whitiſh below, with ſpurious hoofs, and ſomewhat lengthened tail.— 3. *M. Pygmæus*, Pygmy M. Reddiſh brown, white below, without falſe hoofs.—4. *M. Memina*, Meminna. Olive aſh, white below, with the ſides ſpotted with white, and no falſe hoofs.—5. *M. Javanicus*, Java M. Ruſty, longitudinally white beneath, with villous tail, white below and at the tip, and ſmall appendicular hoofs. —6. *M. Americanus*, American M. Rufous brown, with black muzzle and white throat.—7. *M. Delicatulus*, Leverian M. Ruſty brown, ſpotted [illegible] white.

Species 1. *Moſchus Moſchiferus*, Tibetian Muſk. This is an animal of conſiderable importance, as it is from it that the article muſk, ſo uſeful as a medicine and perfume, is derived.

Tibetian M. Fig. 6.

The ſize and general appearance of this animal not ill reſemble thoſe of a ſmall roebuck. It meaſures about three feet three inches in length, about two feet three inches in height from the tip of the ſhoulders to the bottom of the fore feet, and two feet nine inches from the top of the haunches to the bottom of the hind feet. The upper jaw is conſiderably longer than the lower, and is furniſhed on each ſide with a curved tuſk about two inches long, and conſequently expoſed to view when the mouth is cloſed. Theſe tuſks are of a different form from thoſe of any other quadruped, being ſharp-edged on their inner or lower ſide, ſo as to reſemble in ſome degree, a pair of ſmall crooked knives; their ſubſtance is a kind of ivory, as in the tuſks of the babyruſſa and ſome other animals. The ears are long and narrow, of a pale yellow on the inſide, and deep brown on the outſide; the chin is of a yellowiſh caſt; the general colour of the whole body a kind of deep iron-gray, the tips of the hairs being of a ruſty caſt, the remainder blackiſh, growing much paler or whitiſh towards the roots. Each hair is ſomewhat waved throughout its whole length; and is of a ſtrong elaſtic nature, growing ſomewhat upright on the animal, and very thick. In ſome ſpecimens the cheeks are whitiſh, and the ſides of the neck marked by a longitudinal whitiſh band, deſcending to the breaſt, while the flank and ſides are obſcurely ſtriped by a few waved whitiſh ſtreaks; in others the colour is uniform, or as at firſt deſcribed; the hoofs are long and black, the tail extremely ſhort, and ſo concealed by the fur as to be ſcarcely, if at all viſible on a general view.

The female is ſmaller than the male, and wants the tuſks; it has alſo two ſmall teats.

The muſk animal is principally found in the kingdom of Tibet, in the province of Mohang Meng, Tonquin, and Boutan; and it is alſo found about the lake Baikal, and near the rivers Jeniſea and Argun. Its favourite haunts are the tops of mountains covered with pines, where it delights to wander in places of the moſt difficult acceſs, bounding with great celerity, and, when purſued, taking [illegible]

It is hunted for the fake of the muſk contained in its umbilical follicle, which is an oval receptacle, peculiar to the male, about the ſize of a ſmall egg, hanging from the middle of the belly. As ſoon as the animal is killed, the hunters cut off the bag and tie it up for ſale. Tavernier informs us, that in one of his eaſtern journeys, he purchaſed no fewer than 7673 of theſe bags; a proof how numerous theſe animals muſt be in the eaſt. For the appearance and uſes of muſk, with the method of detecting its adulteration, ſee Musk, Materia Medica *Index*. Beſides the muſk that they produce, the ſkins of theſe animals are uſeful as clothing. The Ruſſians ſcrape off the hair, and prepare the leather, ſo as to render it as ſoft and bright as ſilk.

Genus 39. Cervus. *Deer.*

Horns ſolid, covered while young with a hairy ſkin, growing from the top, naked, annual, branched. Front teeth in the lower jaw eight. Canine teeth none (ſometimes ſingle in the upper jaw).

There are 12 ſpecies, viz.—1. *C. Alces*, Elk. With ſtemleſs palmated horns, and guttural caruncle.—2. *C. Tarandus*, Rein D. Branched, recurvate, round horns, with palmated extremities.—3. * *C. Elaphus*, Stag. Reddiſh brown, with cylindric, recurvate, branching horns.—4. * *C. Dama*, Fallow D. Yellowiſh brown, with ſlightly recurvate, compreſſed, branching horns, palmated at the top.—5. *C. Virginianus*, Virginian D. Pale brown, with ſlender round branched horns, bending forward, and ſlightly palmated at the tip.—6. *C. Axis*, Spotted Axis. Pale reddiſh brown, ſpotted with white, with ſlender three-forked horns.—7. *C. Pygargus*, Tailleſs Roe. Tailleſs, brown, yellowiſh below, white behind, with three-forked horns and noſe ſurrounded with black.—8. *C. Mexicanus*, Mexican Roe. Red, with rough three-forked horns, bending forward.—9. *C. Porcinus*, Porcine D. Brown, aſh-coloured below, with ſlender three-forked horns.—10. * *C. Capreolus*, Common Roe. Reddiſh brown, with branching, upright cylindric horns, bifid at the top.—11. *C. Muntjac*, Rib-faced D. With three-forked horns riſing from a cylindric hairy baſe, with the upper fork hooked.—12. *C. Guineenſis*, Gray D. Gray, blackiſh below.

140 *Alces*, Elk. Fig. 64. 1. *C. Alces*, Elk, or Mooſe Deer.—In conformity with the opinion of moſt naturaliſts, we have given the two Engliſh names of Elk and Mooſe Deer as ſynonimous, though it is not yet clearly aſcertained whether they are not really diſtinct ſpecies. The elk is by far the largeſt of the deer tribe, and if we may believe the accounts of ſome travellers, a full grown mooſe is many times bigger than an ox, the tips of its horns being ſometimes nearly 12 feet aſunder. Its ſhape is repreſented as very inelegant, having a ſhort thick neck, large head, horns ſpreading out immediately from the baſe into a broad palmated form; a thick, broad, heavy upper lip, hanging conſiderably over the lower; high ſhoulders and long legs. Its colour is a dark grayiſh brown, much paler, or inclining to whiteneſs, on the legs, and beneath the tail. The hair, which is of a ſtrong, coarſe, and elaſtic nature, is much longer on the top of the ſhoulders and on the ridge of the neck than on the other parts, forming a kind of ſtiffiſh mane; beneath the neck the hair is alſo of conſiderable length, and in ſome ſpecimens of the animal, a ſort of caruncle or pendant excreſcence, covered with long hair, is ſeen hanging from beneath the throat; the eyes and ears are large, the hoofs broad, and the tail extremely ſhort. It is uſually bigger than a horſe, and Mr Pennant eſtimates its greateſt height at 17 hands, and its greateſt weight at 1230 pounds. Its horns ſometimes weigh 56 pounds; and on a moderate calculation, meaſure each about 32 inches in length. The female is ſmaller than the male, and is deſtitute of horns.

Pecora.

This animal inhabits both the Old and New Continent, but it is commonly called elk on the former, and mooſe deer on the latter. In Europe it is found chiefly in Sweden, Norway, and in ſome parts of Ruſſia; in Aſia it is met with moſt frequently in Siberia, where it is of a prodigious ſize; and in America it is moſt common in Canada, eſpecially about the great lakes. It uſually reſides in the midſt of foreſts, where it lives by browſing on the branches of the trees, as from its long legs and ſhort neck it cannot eaſily graze from the ground. It feeds chiefly by night. Its uſual pace is a high, ſhambling, but very ſwift trot, the feet being lifted very high; and, according to moſt writers, the hoofs during its running ſeparate as they approach the ground in order to give the animal a better purchaſe, and come together again when they riſe, producing a clattering noiſe that is heard at a conſiderable diſtance.

Its faculty of hearing is ſuppoſed to be more acute than either its ſight or ſcent, which renders it very difficult to kill it in the ſummer time, as the Indians have then no other method of doing it but by creeping after it among the trees and buſhes, till they get within gunſhot. In winter, when the ſnow is ſo hard frozen that the natives can go upon it in their ſnow ſhoes, they are able frequently to run it down; for its ſlender legs break through the ſnow at every ſtep, and plunge them up to the belly. It is ſo tender-footed, and ſo ſhort-winded, that a good runner will generally tire it in leſs than a day; there have been ſome, however, that have kept the hunters in chaſe for two days. On theſe occaſions the Indians, in general, take with them nothing more than a knife or bayonet, and a little bag containing implements for lighting a fire. When the poor animal is incapable of further ſpeed, it ſtands, and keeps its purſuers at bay with its head and fore feet, in the uſe of the latter of which it is ſo dexterous, that the Indians are generally obliged to laſh their knives or bayonets to the end of a long ſtick, and ſtab the elk at a diſtance. Some who have neglected this neceſſary precaution, and raſhly attempted to ruſh in upon it, have received very ſerious blows from its fore feet. When wounded, it ſometimes becomes furious, ruſhes boldly on the hunters, and endeavours to tread them down: in this caſe the men are frequently compelled to leave their outer garments, and eſcape into the trees.

When ſuddenly rouſed, and endeavouring to make its eſcape, the elk is obſerved at times to fall down, as if deprived for ſome moments of motion. Whether this be owing, as has been frequently imagined, to an epileptic fit, or whether it merely ariſes from fear, is not perhaps eaſy to determine. The fact, however, is too well authenticated to admit our doubting it. This has given riſe to the popular ſuperſtition of attributing to the hoofs the virtue of an antiepileptic medicine; and the Indians even ſtill imagine that the elk has the power of curing itſelf of its own diſorder, or of preventing an approaching

Pecora. approaching ſit, by ſcratching its ear with the hoof till it draws blood.

The female produces from one to three young at a time, generally about the end of April or beginning of May.

The elk is a animal of great utility. Its fleſh is eaten, and is reckoned very good, but coarſer and tougher than any other kind of veniſon; its tongue is excellent, and the fat of its noſe is ſo much like marrow, as to be eſteemed a great delicacy; its ſkin makes excellent tent covers and ſhoe leather, and the hair of its hams, which is of great length, is employed in ſtuffing ſaddles.

141 Tarandus, Rein Deer. 2. *C. Tarandus*, Rein Deer.—This, in a domeſtic point of view, is the moſt uſeful animal to the natives of the countries where it reſides, ſerving there moſt of the purpoſes of our horſes. The height of this ſpecies, when full grown, is about four feet and a half. The body is rather of a thick and ſquare form, and the legs ſhorter in proportion that thoſe of the ſtag. Its general colour is brown above, and white below; but as it advances in age, it often becomes of a grayiſh white, and ſometimes almoſt entirely white; the ſpace about the eyes is always black. The hair on the under part of the neck is of much greater length than the reſt, and forms a kind of hanging beard in that part. Both ſexes are furniſhed with horns, but thoſe of the male are much larger and longer than thoſe of the female. The hoofs are long, large and black, as are alſo the falſe or ſecondary hoofs behind; and theſe latter, while the animal is running, as was remarked of the elk, make a remarkable clattering ſound, which may be heard at a conſiderable diſtance.

The female begins to breed at the age of two years, is in ſeaſon the latter end of September, goes with young eight months, and generally brings forth two at a time. The fondneſs of the dam for her young is very remarkable. They follow her for two or three years, but do not acquire their full ſtrength until four. It is at this age that they are trained to labour, and they continue ſerviceable four or five years. They ſeldom live above 15 or 16 years.

The rein deer is found in all the northern regions of Europe, Aſia, and America, particularly in Lapland, Siberia, and Greenland, where it is employed to draw the ſledges of the inhabitants over the frozen ſnow. To this exerciſe the animals are accuſtomed from an early age. They are yoked to the ſledge by a collar, from which a trace is brought under the belly between the legs, and faſtened to the fore part of the ſledge. Theſe carriages are extremely light, and covered at the bottom with the ſkin of the rein deer. The perſon who ſits in it guides the animal with a cord faſtened to its horns; he drives it with a goad, and encourages it with his voice. Thoſe of the wild breed, though by far the ſtrongeſt, often prove refractory, and not only refuſe to obey their maſter, but turn againſt him, and ſtrike ſo furiouſly with their feet, that his only reſource is to cover himſelf with his ſledge, upon which the enraged creature vents his fury. The tame deer, on the contrary, is pliant, active and willing. When hard puſhed, the rein deer will trot the diſtance of 60 miles without ſtopping; but in ſuch exertions, the poor obedient creature fatigues itſelf ſo exceedingly, that its maſter is obliged to kill it immediately, to prevent a lingering death that would enſue. In general, they go about 30 miles without ſtopping, and that without any dangerous effort. This mode of travelling can be performed only in the winter ſeaſon, when the face of the country is covered with ſnow; and although the conveyance is ſpeedy, it is inconvenient, dangerous, and troubleſome. History of the Species.

As the rein-deer conſtitutes the ſole riches of the Laplander, it may well be ſuppoſed that a conſtant attention to preſerve and ſecure it, forms the chief employment of his life. It is no uncommon thing for one perſon to poſſeſs above 500 in a ſingle herd.

Theſe animals are much tormented by gnats, and a ſpecies of gadfly, called by Linnæus *œſtrus tarandi*. The havock made among them by the latter is ſo great, that their ſkins are often found pierced almoſt full of holes.

The rein-deer has ſometimes been brought into Europe, and Sir H. G. Liddle, Bart. had ſeveral of them in his poſſeſſion, which he brought over from Lapland. They do not, however, ſeem to agree with the more temperate climates.

142 Camelopardalis, or Giraffe.

Gen. 40. CAMELOPARDALIS, *GIRAFFE*.

Horns permanent, bony, covered with a briſtly ſkin. Front teeth in the lower jaw eight; the exterior one on each ſide deeply bilobate. Fig. 65.

This genus was formed to include a ſingle ſpecies that Linnæus and other naturaliſts had claſſed under *cervus*; but as the form and connection of its horns differ very materially from thoſe of the deers and antelopes, it was judged better to conſtitute of it a new genus. This animal, with reſpect to its height, exceeds all other known quadrupeds, as it meaſures, when full grown, nearly 17 feet from the top of the head to the fore feet. The female is lower than the male. Notwithſtanding the unuſual proportions of this animal, its general form is in the higheſt degree elegant and pictureſque; the head being ſmall, the aſpect mild, the neck extremely long and tapering, the fore parts much higher than the hinder, and the diſpoſition of the colours ſingular and pleaſing. At firſt view, the fore legs ſeem nearly twice the length of the hind; but this difference, on accurate examination, appears to reſult chiefly from the extraordinary height of the ſhoulders, compared with that of the thighs; accordingly, among the old writers who have deſcribed this animal, Petrus Gyllius perhaps approaches neareſt to the truth, when he affirms, that all the legs or tibiæ of the camelopardi are of nearly equal length, but that the fore thighs are ſo long in compariſon with the hind, that the back appears inclined like the roof of a houſe.

The horns of the camelopardalis differ in texture from thoſe of all other horned quadrupeds, forming, as it were, a part of the ſkull, and conſiſting of a porous bony ſubſtance covered externally with ſhort, coarſe, briſtly hair; they terminate abruptly, on a flattiſh or ſlightly convex head, but little wider than the other part of the horn, and edged with briſtles all round the outline. On the middle of the forehead is a conſiderable protuberance, owing to an elevation or bony riſing on that part of the ſkull. From the head to the middle of the back runs a ſhort ſtiffiſh mane. The tail is of moderate length, of a cylindrical form, gradually tapering towards the end, and terminating in a tuft of long hair. The hoofs are moderately large and black.

The ſkin of the body is very thick and muſcular, and the hair thin and meagre. The ground colour of the animal is whitiſh, variegated on all parts with numerous, moderately large, and ſomewhat ſquariſh ſpots, which in the male are brown, and in the female tawny. In the younger animals they are ſometimes of a bright reddiſh yellow. Theſe marks or ſpots are of a ſomewhat leſs regular ſhape on the ſides, than on the neck and ſhoulders.

This animal is an inhabitant of Africa, where it is found chiefly in Ethiopia, and other internal parts of the country, being rarely met with near the coaſts. It reſides in the foreſts, where it lives by browſing on the branches of trees. It is of a mild and timid diſpoſition. When purſued, it trots ſo faſt, that even a good horſe is ſcarcely able to keep pace with it, and it continues its courſe for a long time without requiring reſt. When it leaps, it lifts firſt the fore legs, and then the hinder ones, in the manner of a horſe whoſe fore legs are tied together. Its general poſition, except when grazing, is with the head and neck erect. It feeds principally on the leaves of trees, and particular on thoſe of a peculiar ſpecies of *mimoſa*, common in the country where it is found, to which the extreme length of its legs and neck admirably adapt it. When it feeds from the ground, it is under the neceſſity of dividing its fore legs to a conſiderable diſtance. In preparing to lie down, it kneels like the camel.

It has been generally ſuppoſed that the giraffe poſſeſſed neither the power nor the ſtrength to defend itſelf againſt the attacks of other animals; this, however, ſeems to be unfounded, for M. le Vaillant has aſſerted, that by its kicks it frequently wearies, diſcourages, and diſtances even the lion. The utility of the horns appears to be hitherto unknown; this writer ſays that they are not uſed as weapons of defence.

The giraffe is hunted by the Hottentots for the ſake of its fleſh, and its marrow, which latter they eſteem as a great delicacy.

Gen. 41. ANTILOPE. *ANTELOPES.*

Horns hollow, ſeated on a bony core, growing upwards, ringed or wreathed, permanent. Front teeth in the lower jaw eight. Canine teeth none.

The individuals of this genus, with the exception of two or three ſpecies, inhabit the hotteſt parts of the globe, or at leaſt thoſe parts of the temperate zones that lie ſo near the tropics as to form a doubtful climate. None, therefore, except the *ſaiga* and the *chamois*, are to be met with in Europe; and notwithſtanding the warmth of South America is ſuited to their nature, not a ſingle ſpecies has yet been diſcovered in any part of the new world. Their proper climates ſeem, therefore, to be thoſe of Aſia and Africa, where the ſpecies are very numerous.

As there appears a general agreement in the nature of the ſpecies that form this great genus, it will prevent needleſs repetition to obſerve, that the antelopes are animals generally of a moſt elegant and active make; of a reſtleſs and timid diſpoſition; extremely watchful; of great vivacity; remarkably ſwift and agile, and moſt of their boundings ſo light, ſo elaſtic, as to ſtrike the ſpectator with aſtoniſhment. What is very ſingular is, that they will ſtop in the midſt of their courſe, gaze for a moment at their purſuers, and then reſume their flight.

As the chaſe of theſe animals is a favourite amuſement with the eaſtern nations, from that may be collected proofs of the rapid ſpeed of the antelope tribe. The greyhound, the fleeteſt of dogs, is uſually unequal in the courſe, and the ſportſman is obliged to call in the aid of the falcon, trained for the purpoſe, to ſeize on the animal, and impede its motions, in order to give the dogs an opportunity of overtaking it. In India and Perſia a ſpecies of leopard is made uſe of in the chaſe. This is an animal that takes its prey not by ſwiftneſs of foot, but by the greatneſs of its ſprings, by motions ſimilar to thoſe of the antelope; but ſhould the leopard fail in its firſt eſſay, the game eſcapes.

The fleetneſs of the antelope was proverbial in the country it inhabited, even in the earlieſt times: the ſpeed of Aſahel is beautifully compared to that of the tzebi, and the Gadites were ſaid to be as ſwift as the antelopes upon the mountains. To this day the greateſt compliment that can be paid to female beauty in the eaſtern regions is *Aine el czazel*, You have the eyes of an antelope.

Some ſpecies of antelopes form herds of 2000 or 3000; while others keep in troops of only five or ſix. They generally reſide in hilly countries, though ſome inhabit plains. They often browſe like the goat, and feed on the tender ſhoots of trees, from which their fleſh acquires an excellent flavour. The fleſh of moſt of the ſpecies is eaten, but that of ſome of them is ſaid to taſte of muſk.

This is a very numerous genus, and moſt of the ſpecies are comparatively new, only ſix having been known to Linnæus, who ranked them under the genus *Capra*. The following are enumerated by Dr Shaw, though he confeſſes himſelf not certain that they are all diſtinct ſpecies.

A. *With ſtraight or nearly ſtraight horns.*

1. *Antilope Oryx*, Egyptian A. Gray, with black and white face, duſky dorſal ſtripe, and very long, tapering, ſharply-ringed horns.—2. *A. Leucoryx*, White A. Milk white, with very long, tapering, ſlightly-ringed horns.—3. *A. Gazella*, Gazel. Bay, with ſlightly-bowed, tapering, wrinkled horns.—4. *A. Orcas*, Indian A. Slate-coloured, with reddiſh head, black mane on the neck and breaſt, and tapering wreathed horns.—5. *A. Ourebi*, Ourebi. Ruſty brown, with the breaſt, belly, hind part of the thighs, and inſides of the limbs, white; and ſmall horns.—6. *A. Oreotragus*, Klipſpringer. Yellowiſh tawny; whitiſh below, with very ſtraight upright tapering horns, ſlightly wrinkled at their baſe.—7. *A. Scriptus*, Harneſſed A. Cheſnut-coloured, with white croſſed ſtripes on the ſides; and tapering wreathed horns.—8. *A. Grimmia*, Guinea A. Yellowiſh bay, with ſhort horns, and black briſtly tuft on the forehead.—*A. Pygmæa*, Pigmy A. With ſhort convex horns, wrinkled at the baſe.

B. *With curved, bent, or twiſted horns.*

10. *A. Picta*, Nyl-ghau. Slate-coloured, with the back of the neck and breaſt maned, the feet barred with black and white, and ſomewhat triangular horns bending forwards.—11. *A. Tragocamelus*, Indoſtan A. Gray, with maned neck and breaſt, dorſal protuberance, long

Pecora. long flocky tail, and tapering horns bending forwards.—12. *A. Bubalis*, Cervine A. Reddish brown, with large elongated head, thick, strongly wrinkled, lyrated horns, and longish tail.—13. *A. Strepsiceros*, Striped A. Reddish gray, with compressed spirally ringed horns, white longitudinal band, and transverse lateral stripes. 14. *A. Cervicapra*, Common A. Tawny brown, white below, with round, lyrated, ringed horns.—15. *A. Lerwia*, Gambian A. Reddiſh, with the nape of the neck bearded, and recurved wrinkled horns.—16. *A. Saiga*, Saiga. Yellowiſh gray, with diſtant, ſemitranſparent, lyrated, and ringed horns.—17. *A. Gutturoſa*, Chineſe A. Tawny, whitiſh below, with lyrated yellowiſh ringed horns, and prominent throat.—18. *A. Subgutturoſa*, Guldenſted's A. Gray-brown, white below, with lyrated horns, and tumid throat.—19. *A. Euchore*, Springer. Yellowiſh brown, white below, with dark lateral ſtripe, lyrated horns, and expanſile white patch above the tail. 20. *A. Arundinacea*, Ritbock. Aſh-coloured, white below, with ringed horns, bending forwards.—21. *A. Sylvatica*, Boſhbock. Brown-white below, the hind part of the body ſpotted with white, the horns ſpirally, and ringed.—22. *A. Eleotragus*, Cinereous A. Gray, ſnow-white below, with ſpirally ringed horns.—23. *A. Dorcas*, Barbary A. Fulvous brown, white below, with lateral-brown band, and lyrated horns.—24. *A. Kevella*, Flat-horned A. Tawny-brown, white below, with brown lateral band, and compreſſed lyrated horns.—25. *A. Pygarga*, White-faced A. Ruſty brown, white below, with brown lateral band, white rump, and lyrated horns.—26. *A. Corinna*, Corine. Fulvous brown, white below, with dark lateral band, and ſublyrated, rather erect, ſmoothiſh horns.—27. *A. Sumatrenſis*, Sumatran A. Black, with recurved horns, and whitiſh briſtly name between the ſhoulders.—28. *A. Leucophæa*, Blue A. Blue gray, with roundiſh, arcuated, recurved, ringed horns.

C. *With hooked horns.*

29. *A. Gnu*, Gnu. Ruſty brown, with maned neck, whitiſh tail, and horns directed forwards, and then ſuddenly backwards.—30. *A. Dama*, Nanguer. White, with fulvous back, and round horns, incurvated forwards.—*A. Ridunca*, Red A. Red brown, with round ſlightly ringed horns, recurved forwards at the tips.—32. *A. Rupicapra*, Chamois. Brown, with ſmooth upright horns, with the tips hooked forwards.

144 cta, yl-ghau. ig. 66. 10. *A. Picta*, the Nyl-ghau.—This curious animal was firſt deſcribed by Dr W. Hunter, in the Philoſophical Tranſactions, vol. lxi. Its height is about four feet to the top of the ſhoulders, and it meaſures nearly about the ſame in length from the bottom of the neck to to the baſe of the tail. It is of a fine ſlate colour, with a large white ſpot below the throat, and two white bands above each foot. Its ears are large, edged with white, white within, where they are marked with two black ſtripes. Along the top of the neck there is a ſlight black mane, continued to ſome diſtance down the back, and on the breaſt there is a much thicker mane, or tuft of the ſame colour. The tail is moderately long, and tufted at the end: the horns are ſhort, pointed, ſmooth, and three-cornered at the baſe. The female reſembles the male in general appearance, but is conſiderably ſmaller. This animal is a native of the more interior parts of India, and was a favourite object of the chace with the emperor Aurengzebe. Some years ago two of them were brought into England, and were kept ſome time by Dr Hunter, who has given the following account of its manners.

Although the nyl-ghau is uſually reported to be exceedingly vicious, yet the one he had the care of was very gentle. It ſeemed pleaſed with every kind of familiarity, always licked the hand which either ſtroked it or gave it bread, and never once attempted to uſe its horns offenſively. It ſeemed to have much dependence on the organs of ſmell, and ſnuffed keenly, and with conſiderable noiſe, whenever any perſon came within ſight. It did the ſame when any food or drink was brought to it, and was ſo offended with an uncommon ſmell, or was ſo cautious, that it would not taſte bread that was offered with a hand that had touched oil of turpentine or ſpirits.

Its manner of fighting was very particular; this was obſerved at Lord Clive's, where two males were put into a little incloſure, and it was thus related by his lordſhip. While they were at a conſiderable diſtance from each other, they prepared for the attack by falling down upon their fore knees, and when they were come within ſome yards, they made a ſpring, and darted againſt each other.

At the time that two of them were in his ſtable, Dr Hunter obſerved this particularity, that whenever any attempt was made on them, they immediately fell down upon their fore knees; and ſometimes they would do ſo when he came before them; but as they never darted, he ſo little ſuppoſed this to be a hoſtile poſture, that he rather ſuppoſed it to be expreſſive of a timid humility.

The intrepidity and force with which they dart againſt any object may be conceived from an anecdote that has been related of the fineſt and largeſt of theſe animals that has ever been ſeen in England. A poor labouring man, without knowing that the animal was near him, and therefore neither meaning to offend, nor ſuſpecting the danger, came up to the outſide of the poles of the incloſure where it was kept; the nyl ghau, with the ſwiftneſs of lightning, darted againſt the wood-work with ſuch violence that he ſhattered it to pieces, and broke off one of his horns cloſe to the root. This violence was ſuppoſed to occaſion his death, which happened not long after. From this it appears, that at certain ſeaſons the animal is vicious and fierce, however gentle it may be at other times.

Genus 42. Capra, Goats.

Horns hollow, turning upwards and backwarks, rough, almoſt cloſe at their baſe. Front teeth in the lower jaw eight. No tuſks. Chin bearded in the male.

There are eight ſpecies; viz.

1. *C. Ibex*, Ibex. Gray brown, whitiſh below, with large horns, bending over the back; and bearded throat.—2. *C. Caucaſica*, Caucaſian I. Gray brown, white below, with large, keeled, ſlightly-wrinkled, bowed horns, and bearded throat.—3. *C. Hircus*, Common G. With bowed keeled horns, commonly turning outwards towards the end.—4. *C. Mambrica*, Syrian G.

With

Hiſtory of the Species.

With pendulous ears and horns reclined backwards.—5. *C. Angorenſis*, Angora G. With very long, pendent, ſpirally-curled hair.—6. *C. Depreſſa*, African G. With very ſmall depreſſed horns, cloſely incumbent on the head.—7. *C. Reverſa*, Whidaw G. With upright horns, recurved at the tips.—8. *C. Capricornus*, Capricorn G. With ſhort horns, turning forwards at the tips, and ringed on the ſides.

145 Ibex.

1. *Ibex*, Ibex.—As this is ſuppoſed to have been the original ſtock from which the common goat has been derived, we ſhall here give a ſhort account of it.

This is an animal of great ſtrength and activity, and is conſiderably larger than the common goat. It is of a deep hoary, or grayiſh brown colour, with a whiter ſhade below, and on the inſides of the limbs. The body is thick and ſtrong, the head rather ſmall; eyes large, and the horns very large and long, ſo as ſometimes to extend the whole length of the body. Theſe are of a deep brown colour, and are marked above with tranſverſe ſemicircular protuberances or knots. The legs are ſtrong, with ſhort hoofs; the tail is ſhort, and the chin is furniſhed with a brown or duſky beard. The female is leſs than the male, and has ſmaller horns.

The ibex is found in ſeveral parts of Europe and Aſia, chiefly in the mountainous parts of the country, eſpecially the Carpathian and Pyrenean mountains, the Rhætian Alps, Mount Taurus, the high lands between Eaſtern Tartary and Siberia, and on the mountainous parts of the iſland of Candia.

The fleſh of the young ibex is ſaid to be in good eſteem as an article of food. Its period of geſtation is ſaid to be the ſame as in the common goat; viz. five months.

In its general habits or manners the ibex reſembles the common goat, but poſſeſſes every attribute of ſtrength and activity in a degree proportioned to its natural ſtate of wildneſs. It delights to climb mountains, and hang upon the brinks of precipices; and its chaſe is in conſequence conſidered, like that of the *chamois*, as in the higheſt degree difficult and laborious. It is even ſaid, that when hard preſſed, this animal will fling itſelf down a ſteep precipice, and falling on its horns eſcape unhurt from its purſuers; nor will this appear in the leaſt incredible, if we may rely on the faith of *Monardes*, who aſſures us that he ſaw a *Caucaſan ibex* leap from the top of a high tower, and, falling on its horns, immediately ſpring up on its limbs, and leap about without having received the leaſt apparent injury.

Two or three hunters uſually aſſociate in this perilous occaſion; they are armed with rifle-barreled guns, and furniſhed with ſmall bags of proviſions; they erect a miſerable hut of turf among the heights, where, without fire or covering, they paſs the night; and on awaking in the morning, they not unfrequently find the entrance blocked up with ſnow three or four feet deep. Sometimes, in purſuit of this animal, being overtaken by darkneſs, amid crags and precipices, they are obliged to paſs the whole night ſtanding, and embraced together, in order to ſupport each other, and to prevent themſelves from ſleeping.

For an account of the common goat, we refer our readers to Buffon and Mr Pennant's Britiſh Zoology, where they will meet with every thing of conſequence reſpecting that uſeful animal.

Pecora.

147 Ovis.

Gen. 43. OVIS, *Sheep*.

Horns hollowed, wrinkled, turning backwards, and ſpirally twiſted inwards. Front teeth eight in the lower jaw. Canine teeth none.

There are uſually enumerated about eight ſpecies.

1. *Ovis Ammon*, Argali. With arched ſemicircular horns, flat below, and looſe hairy dewlaps.—2. * *O. Aries*, Common S. With compreſſed lunated horns.—3. *O. Strepſiceros*, Cretan S. With upright, keeled, ſpirally twiſted horns.—4. *O. Polycerata*. Many-horned S.—5. *O. Guineenſis*, African S. With pendulous ears, looſe hairy dewlaps, and head prominent at the back.—6. *O. Laticaudata*, Broad-tailed S.—7. *O. Steatopyga*, Fat-rumped S.—8. *O. Pudu*, Pudu. With ſmooth round diverging horns, and beardleſs throat.

148 *Aries*. Co mon Shee

2. *Ovis Aries*, Common Sheep.—In its preſent ſtate of domeſtication, the ſheep ſeems ſo far removed from a ſtate of nature as to make it a difficult matter to point out its origin. But naturaliſts are now generally of of opinion, that it has proceeded from the argali or wild ſheep, (the *mouflon* of Buffon).

Climate, food, and above all, the unwearied arts of cultivation, contribute to render this animal in a peculiar manner, the creature of man, to whom it is obliged to truſt entirely for its protection, and to whoſe neceſſities it largely contributes. Though ſingularly inoffenſive, and harmleſs even to a proverb, it does not appear to be that ſtupid, inanimate creature deſcribed by Buffon: "devoid of every neceſſary art of ſelf-preſervation, without courage, and even deprived of every inſtinctive faculty, we are led to conclude that the ſheep, of all other animals, is the moſt contemptible and ſtupid." But amidſt thoſe numerous flocks which range without controul on extenſive mountains, where they ſeldom depend upon the aid of the ſhepherd, it will be found to aſſume a very different character. In thoſe ſituations, a ram or wedder will boldly attack a ſingle dog, and often comes off victorious; but when the danger is more alarming, they have recourſe to the collected ſtrength of the whole flock. On ſuch occaſions they draw up into a compact body, placing the young and the females in the centre, while the males take the foremoſt ranks, keeping cloſe by each other. Thus an armed front is preſented to all quarters, and cannot be eaſily attacked without danger of deſtruction to the aſſailant. In this manner they wait with firmneſs the approach of the enemy; nor does their courage fail them in the moment of attack; for when the aggreſſor advances within a few yards of the line, the rams dart upon him with ſuch impetuoſity, as lays him dead at their feet, unleſs he ſave himſelf by flight. Againſt the attacks of ſingle dogs or foxes, when in this ſituation, they are perfectly ſecure. A ram, regardleſs of danger, will ſometimes engage a bull, and his forehead being much harder than that of any other animal, he ſeldom fails to conquer. The bull, by lowering his head, receives the ſtroke of the ram between his eyes, which uſually brings him to the ground.

In the ſelection of their food, few animals diſcover greater ſagacity than the ſheep, nor does any domeſtic animal ſhew more dexterity and cunning in its attempts to elude the vigilance of the ſhepherd, in order to ſteal ſuch delicacies as are agreeable to its palate.

Beſides

Pecora. Beſides its hardineſs in enduring great ſeverities of weather, the natural inſtinct of the ſheep, in foreſeeing the approach of a ſtorm, is no leſs remarkable. In their endeavours to ſecure themſelves under the ſhelter of ſome hill, whole flocks have frequently been buried for many days under a covering of ſnow, and have afterwards been taken out without any material injury.

There have been inſtances, where ſheep, at the approach of a ſtorm, have fled for ſhelter to a neighbouring cottage, and taken refuge under the ſame roof with their ſhepherd.

The variety in this creature is ſo great, that ſcarcely any two countries produce ſheep of the ſame kind. There is found a manifeſt difference in all, either in the ſize, the covering, the ſhape or the horns. The woolly ſheep is found only in Europe, and the temperate provinces of Aſia. When tranſported into warmer climates, it loſes its wool, and becomes rough and hairy, is leſs fertile, and its fleſh no longer retains the ſame flavour.

No country produces finer ſheep than Great Britain; their fleeces are large, and well adapted to the purpoſes of clothing. The Spaniſh fleeces are indeed finer, but for utility cannot be compared with thoſe of Lincolnſhire or Warwickſhire. In Edward III's time, when wool was allowed to be exported, it brought into the kingdom 150,000l. per annum. at the rate of 2l. 10s. a pack. At this time, when our woollen manufactory ſtands unrivalled by any nation of the world, and when every method is taken to prevent this valuable commodity from being ſent out of the kingdom, the annual value of wool ſhorn in England is ſuppoſed to be about 5,000,000l. ſterling, and when manufactured together with the Spainſh wool imported, amounting to about 600,000l. the total value muſt be above 20,000,000l.

Two of the front teeth in the ſheep drop out before they are two years old, at which time they are replaced by others; at three years old, four of them are renewed, and the remainder at the age of four.

The ewe produces one or two lambs at a time, and ſometimes, though rarely, three or four. She bears her young five months, und brings forth in the ſpring. The ram lives to the age of about 15 years, and begins to procreate at one. When caſtrated, they are called wedders. They then grow ſooner fat, and the fleſh becomes finer and better flavoured.

There is hardly any part of this animal that is not ſerviceable to man: of the fleece we make our clothes; the ſkin produces leather, of which are made gloves parchment, and covers for books; the entrails are formed into ſtrings for fiddles, and other muſical inſtruments, likewiſe coverings for whips; its milk affords both butter and cheeſe, and its fleſh is a delicate and wholeſome food.

To the foregoing account of the ſheep, for which we are indebted to Mr Bewick, we ſhall add a few remarks from Mr Cully's obſervations on live ſtock, on the moſt remarkable breeds of ſheep at preſent cultivated in this country.

Mr Cully begins with thoſe of Lincolnſhire, which are of a large ſize, big-boned, and afford a greater quantity of wool than any other kind, owing to the rich fat marſhes on which they feed; but their fleſh is coarſe, leaner, and not ſo finely flavoured as that of ſmaller ſheep. The ſame breed extends, with ſome variations, through moſt of the midland counties of England. But the largeſt breed of ſheep in this iſland, is to be met with on the banks of the Tees, which runs through a rich and fertile country, dividing the two counties of Yorkſhire and Durham. This kind differs from the preceding, in their wool not being ſo long and heavy; their legs are longer, but finer boned, and ſupport a thicker, firmer carcaſe. Their fleſh is likewiſe much fatter, and finer grained. These ſheep weigh from 25 or 45 lbs. per quarter; ſome have been fed to 50 lbs. and one in particular was killed which weighed 62 [illegible] 10 oz. per quarter, avoirdupois; a circumſtance never before heard of in this iſland. The ewes of this breed generally bring forth two lambs each ſeaſon; ſometimes 3, 4, and even 5. As an inſtance of extraordinary fecundity, it deſerves to be mentioned, that one of theſe ewes at the age of two years, brought forth ſix lambs at one time, the next ſeaſon five, both within 11 months.

The Dorſetſhire breed is likewiſe remarkably prolific, the ewes being capable of bringing forth twice a year. It is from theſe, that the tables of our nobility and gentry are ſupplied with early lamb at Chriſtmas, or ſooner if required. Great numbers of thoſe early victims to luxury are yearly ſent to the London markets, where they are ſold at the enormous price of 10s. 6d. or perhaps 15s. per quarter. The manner of rearing the lambs is curious. They are impriſoned in little dark cabins; the ewes are fed with oil-cakes, hay, corn, turnips, cabbages, or any other food which the ſeaſon of the year affords; theſe are given them in a field contiguous to the apartments where the lambs are kept; and at proper intervals, the nurſes are brought in to give ſuck to their young ones, while the attendants, at the ſame time, make their lodgings perfectly clean, and litter them with freſh ſtraw. Great attention is paid to this as much of the ſucceſs of rearing theſe unſeaſonable productions depends upon warmth and cleanlineſs.

The Dorſetſhire ſheep are moſtly white-faced, their legs are long and ſmall, and great numbers of them have no wool upon their bellies, which gives them an uncouth appearance. They produce a ſmall quantity of wool, but of a good quality, from which our fine Wiltſhire cloths are made. The mutton of theſe ſheep is very ſweet and well flavoured. The variations of this breed are ſpread through moſt of the ſouthern counties, but the true kind is only to be found in Dorſetſhire and Wiltſhire. There is a breed, not unlike this, in Norfolk and Suffolk, but they are all gray or black-faced.

For ſome obſervations on feeding ſheep, ſee AGRICULTURE, N° 600; for the beſt method of providing them with ſhelter againſt the weather, ſee FARRIERY, N° 109; and for ſome account of their diſeaſes, with the moſt approved methods of treatment, ſee the ſame article, Part vi. *paſſim*.

Gen. 44. Bos, *Ox*.

Horns concave, turned outwards, lunated, ſmooth. Front teeth eight in the lower jaw. Canine teeth none.

There are numerous varieties, but naturaliſts have not diſtinguiſhed more than about ſix ſpecies; viz.

1. * *Bos Taurus*, Common O. With round horns curving outward; and looſe dewlap.—2. *B. Arnee*, [illegible]

Wild

[illegible] very straight long horns, flat and wrinkled in their upper surface.—3. *B. Bubalus*, Buffalo. With horns lying backwards, turning inwards, and flat on the fore part.—4. *B. Moſchatus*, Muſk O. With very long pendent hair, and horns approximated at the baſe, bending inwards and downwards, and outwards at the tips.—5. *B. Grunniens*, Yak. With cylindric horns curving outwards, very long pendent hair, and extremely villous, horſe-like tail.—6. *B. Caffer*, Cape O. With the horns very broad at the baſe, then ſpreading downwards, next upwards, and at the tips curving inwards.

Common Ox. 1. *Bos Taurus*, Common Ox.—Few animals are more widely diffuſed over the globe than the common ox. Under different names, diſtinguiſhing ſeveral varieties, it is found in a wild or domeſtic ſtate throughout almoſt the whole of the old continent, in moſt of the European and Aſiatic iſlands, and is very abundant in ſeveral parts of America. It ſeems capable of enduring equally the rigours of heat and cold, and inhabits the frozen as well as the moſt ſcorching climates. Moſt animals preſerve nature in their form with inflexible perſeverance, but the ox appears to ſuit himſelf in every reſpect to the wants and conveniences of mankind. In no animal is there to be found a greater variety of kinds, and in none a more humble and tractable diſpoſition. Though in many countries theſe animals are larger than thoſe of Britain, yet on the whole our cattle are to be preferred, both for beauty of form, excellence of fleſh, and general utility, to thoſe of moſt other countries.

The climate of the Britiſh iſles is, above moſt others, productive of the greateſt variety and abundance of wholeſome vegetables, which are almoſt equally diffuſed throughout every part of them. Hence the number, variety, and excellence of our cattle, the richneſs of our dairies, and innumerable other advantages. Cæſar ſpeaks of the numbers of our cattle, and adds that we neglected tillage, but lived on milk and fleſh. Strabo takes notice of our plenty of milk, but ſays we were ignorant of the art of making cheeſe. Mela informs us, that the wealth of the Britons conſiſted in cattle; and in his account of Ireland reports, that ſuch was the richneſs of the paſtures in that kingdom, that the cattle would even burſt if they were ſuffered to feed in them long at a time.

This preference of paſturage to tillage was delivered down from our Britiſh anceſtors to much later times; and continued equally prevalent during the whole period of our feodal government: the chieftain whoſe power and ſafety depended on the promptneſs of his vaſſals to execute his commands, found it his intereſt to encourage thoſe employments that favoured that diſpoſition; the vaſſal, who made it his glory to fly at the firſt call to the ſtandard of his chieftain, was ſure to prefer that employment which might be tranſacted by his family with equal ſucceſs during his abſence. Tillage would require an attention incompatible with the ſervices he owed the baron; while the former occupation not only gave leiſure for thoſe duties, but furniſhed the hoſpitable board of his lord with ample proviſion, of which the vaſſal was equally partaker. The relics of the larder of the elder Spencer are evident proofs of the plenty of cattle in his days; for after his winter proviſions may have been ſuppoſed to be moſtly conſumed, there were found, ſo late as the month of May, in ſalt, the carcaſes of no fewer than 80 beeves, 600 bacons, and 600 muttons. The accounts of the ſeveral great feaſts in after times, afford amazing inſtances of the qaantity of cattle that were conſumed in them. This was owing partly to the continued attachment of the people to grazing; partly to the preference that the Engliſh at all times gave to animal food. The quantity of cattle that appear from the lateſt calculation to have been conſumed in London, is a ſufficient argument of the vaſt plenty of theſe times; particularly when we conſider the great advancement of tillage, and the numberleſs variety of proviſions, unknown to paſt ages, that are now introduced into theſe kingdoms from all parts of the world.

Pecora.

This animal ſeems to have originated from a large wild variety called the biſon, diſtinguiſhed by its general largeneſs, particular ſtrength of its fore parts, and a thick ſhaggy mane and beard about its neck and chin. This variety is found both in Europe and America, and from this all the varieties at preſent met with are deſcended. Beſides the biſon, and what may ſtrictly be called the common ox, writers enumerate under this ſpecies the varieties called *zebu*, diſtinguiſhed by a ſmall ſingle bunch over the ſhoulders; the *Indian ox*, having a very large double or treble protuberance over the ſhoulders; the *looſe-horned ox*, whoſe horns ſeem attached only by the ſkin; the *boury*, having a protuberance on the back; the *Tinian ox*, of a white colour with black ears; and ſeveral other leſs important varieties. In Britain we diſtinguiſh chiefly the *Holſtein* breed, the *Lancaſhire*, and *Lincolnſhire* breeds, the *Kyloe* or Highland cattle; the *Alderney* cow, and a particular ſpecies of wild cattle.

In moſt points of view, the female of this ſpecies is of more importance than the male. The cow goes with young nine months, and ſeldom produces more than one at a time. She has, as is well known, four teats, which, in proportion to her young, is a peculiarity ſcarcely to be found in any other animal, the females of which ſeldom have more teats than are ſufficient to ſuckle the number of young which they produce.

The age of a cow is known by its horns. At the age of four years, a ring is formed at their roots, and every ſucceeding year another ring is added. Thus, by allowing three years before their appearance, and then reckoning the number of rings, the creature's age may be exactly known (H).

The quantity of milk given by cows is very various; ſome will yield only about ſix quarts in one day, while others give from 10 to 15, and ſometimes even 20. The

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(H) In the earlier editions of his natural hiſtory, Buffon aſſerted that the bull and cow ſhed their horns at the age of three years, and at this time had them replaced by others that were permanent. As this miſtake was corrected in his ſupplemental volumes, we ſhould not now have thought it neceſſary to notice it, had we not [illegible] work of conſiderable merit, and bearing the reſult of much experience, Mr John Lawrence's [illegible] Cattle, p. [illegible]

Pecora.

The richneſs of the paſture contributes not a little to its increaſe. There have been inſtances of cows giving upwards of 30 quarts of milk in one day. In ſuch caſes there is a neceſſity for milking them thrice. From the milk of ſome cows, 12lbs. or 14lbs. of butter are made in a week.

It is a curious fact, that, in ſome inſtances, cows are naturally barren; and this is ſaid to happen when a cow brings forth two calves, one of them a male, the other a female: the former is a perfect animal, but the latter is incapable of propagation, and is well known to farmers under the denomination of a *free-martin*. It reſembles the ox, or ſpayed heifer, in figure, and is conſiderably larger than the cow. It is ſometimes preferred by the farmer, for the purpoſe of yoking with the oxen, or fattening for the table. Mr Hunter obſerves, that the fleſh of the free-martin, like that of the ox, is in common much finer in the fibre than either the bull or cow. It is ſuppoſed to exceed that of the heifer in delicacy of flavour, and bears a higher price at market*.

It is unneceſſary to enlarge further on the ox in a domeſtic ſtate. We ſhall therefore only give a ſhort account of a very ſingular ſpecies of wild cattle that were formerly found in this country, but which are now nearly extinct.

Numerous herds of them were kept in ſeveral parts of England and Scotland, but they have been deſtroyed by various means. The only breeds now remaining in the kingdom are in the park at Chillingham-caſtle in Northumberland; at Wollaton in Nottinghamſhire, the ſeat of Lord Middleton; at Giſburne, in Craven, Yorkſhire; at Limehall in Cheſhire, and at Chartley in Staffordſhire.

The principal external appearances which diſtinguiſh this breed of cattle from all others are the following. Their colour is invariably white, muzzles black; the whole of the inſide of the ear, and about one-third of the outſide, from the tip downwards, red; horns white, with black tips, very fine, and bent upwards. Some of the bulls have a thin upright mane, about one inch and a half or two inches long.

At the firſt appearance of any perſon, they ſet off in full gallop, and at the diſtance of 200 or 300 yards, make a wheel round, and come boldly up again, toſſing their heads in a menacing manner. On a ſudden they make a full ſtop, at the diſtance of 40 or 50 yards, looking wildly at the object of their ſurpriſe; but upon the leaſt motion being made, they all again turn round, and fly off with equal ſpeed, but not to the ſame diſtance. Forming a ſhort circle, and again returning with a bolder and more threatening aſpect than before, they approach much nearer, probably within 30 yards, when they make another ſtand, and again fly off. This they do ſeveral times, ſhortening their diſtance, and advancing nearer, till they come within ten yards, when moſt people think it prudent to leave them, not chooſing to provoke them further, for there is little doubt but in two or three turns more they would make an attack.

The mode of killing them was, perhaps, the only modern remains of the grandeur of ancient hunting. On notice being given, that a wild bull would be killed on a certain day, the inhabitants of the neighbourhood came mounted, and armed with guns, &c. ſometimes to the amount of 100 horſe and 500 foot, who ſtood upon walls, or got into trees, while the horſemen rode off the bull from the reſt of the herd, until he ſtood at bay, when a markſman diſmounted and ſhot. At ſome of theſe huntings, 20 or 30 ſhots have been fired before he was ſubdued. On ſuch occaſions the bleeding victim grew deſperately furious, from the ſmarting of his wounds, and the ſhouts of ſavage joy that were echoing from every ſide. But, from the number of accidents that happened, this dangerous mode has been little practiſed of late years; the park-keeper alone generally ſhooting them with a rifled gun at one ſhot.

Hiſtory of the Species.

When the cows calve, they hide their calves for a week or ten days in ſome ſequeſtered ſituation, and go and ſuckle them two or three times a day. If any perſon come near the calves, they clap their heads cloſe to the ground, and lie like a hare in form, to hide themſelves. This is a proof of their native wildneſs, and is corroborated by the following circumſtance that happened to the writer of this narrative, who found a hidden calf, two days old, very lean, and very weak. On ſtroking its head, it got up, pawed two or three times like an old bull, bellowed very loud, ſtepped back a few ſteps, and butted at his legs with all its force: it then began to paw again, bellowed, ſtepped back, and butted as before; but knowing its intention, and ſtepping aſide, it miſſed him, fell, and was ſo very weak that it could not riſe, though it made ſeveral efforts. But it had done enough. The whole herd were alarmed, and coming to its reſcue, obliged him to retire; for the dams will allow no perſon to touch their calves without attacking them with impetuous ferocity. When any one happens to be wounded, or is grown weak and feeble through age or weakneſs, the reſt of the herd ſet upon it, and gore it to death.

The weight of the oxen is generally from 30 to 50 ſtones the four hind quarters, the cows about 30. The beef is finely marbled, and of excellent flavour*.

There is ſcarcely any part of the ox that is not of ſome uſe to mankind. Boxes, combs, knife-handles, and drinking veſſels, are made of the horns. Theſe, when ſoftened with boiling water, become ſo pliable, as to be formed into tranſparent plates for lanterns; an invention aſcribed to King Alfred, who is ſaid to have firſt uſed them to preſerve his candle time-meaſures from the wind. Their dung is uſeful for manure. Glue is made of the cartilages, griſtles, and the finer pieces of cuttings and parings of the hides, boiled in water till they become gelatinous, and the parts ſufficiently diſſolved, and then dried. The bone is a cheap ſubſtitute, in many inſtances, for ivory. The thinneſt of the calves-ſkins are manufactured into vellum. The blood is uſed as the baſis of Pruſſian blue. Sadlers and others uſe a fine ſort of thread, prepared from the ſinews, which is much ſtronger than any other equally fine. The hair is valuable in various manufactures, and the ſuet, fat, and tallow, for candles. The utility of the milk and cream is well known.

From the circumſtance of theſe animals furniſhing the Gentoos with milk, butter and cheeſe, their favourite food, they bear for them a ſuperſtitious veneration, founded thus principally in gratitude. There is ſcarcely a [illegible] and that would not, were he under a [illegible], rather [illegible] his parents or children to the [illegible] of a bull or cow.

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* See Hunter on the animal economy.

* Bewick's *Quadrupeds*.

For the application of cows to the purpoſes of agriculture, and for the beſt methods of rearing, breeding, and feeding common cattle, ſee AGRICULTURE; for an account of the internal ſtructure of this genus, ſee Anatomy, Part IV. Chap. IV. Sect. III.; for the conſtruction of byres or cow-houſes, with ſome obſervations on the feeding of cows and calves, ſee FARRIERY Part IV.; and for the diſeaſes incident to cattle, with their treatment, ſee the ſame article, Part VI.

151 G[illegible] tary. [illegible] 3. B. Grunniens. Yak, or Grunting Ox.—The beſt account of this ſingular ſpecies is that given by Captain Turner, in his account of an embaſſy to Tibet. It is as follows.

The yak of Tartary, called *ſoora goy* in Hindoſtan, and which Captain Turner terms the *buſhy-tailed bull of Tartary*, is about the height of an Engliſh bull, which it reſembles in the general figure of the body, head, and legs. He could diſcover between them no eſſential difference, except that the yak is covered all over with a thick coat of long hair. The head is rather ſhort, crowned with two ſmooth round horns, which, tapering from the root upwards, terminate in ſharp points; they are arched inwards, bending towards each other, but near the extremities are a little turned back. The ears are ſmall; the forehead appears prominent, being adorned with much curling hair; the eyes are full and large; the noſe ſmall and convex; the noſtrils ſmall, the neck ſhort, deſcribing a curvature nearly equal both above and below; the withers are high and arched. The rump is low; over the ſhoulder riſes a thick muſcle, which ſeems to be the ſame kind of protuberance peculiar to the cattle of Hindoſtan, covered with a profuſion of ſoft hair, which in general, is longer and more copious than that along the ridge of the back to the ſetting on of the tail. The tail is compoſed of a prodigious quantity of long, flowing, gloſſy hair, and is ſo abundantly furniſhed, that not a joint of it is perceptible; but it has much the appearance of a large cluſter of hair artificially ſet on; the ſhoulders, rump, and upper part of the body, are clothed with a ſort of thick ſoft wool, but the inferior parts with ſtraight pendant hair that deſcends below the knee; and Captain Turner has ſeen it ſo long in ſome cattle, which were in high health and condition, as to trail upon the ground. From the cheſt, between the legs, iſſues a large pointed tuft of ſtraight hair, growing ſomewhat longer than the reſt; the legs are very ſhort; in every other reſpect he reſembles the ordinary bull.

Theſe cattle, though not large-boned, ſeem, from the profuſe quantity of hair with which they are provided, to be of great bulk. They have a downcaſt heavy look, and appear, what indeed they are, ſullen and ſuſpicious, diſcovering much impatience at the near approach of ſtrangers. They do not low loud like the cattle of Britain, any more than thoſe of Hindoſtan, but make a low grunting noiſe, ſcarcely audible, and that but ſeldom, when under ſome impreſſion of uneaſineſs. Theſe cattle are paſtured in the coldeſt parts of Tibet, upon the ſhort herbage peculiar to the tops of mountains and bleak plains. The chain of mountains ſituated between the latitudes of 27° and 28°, which divides Tibet from Bootan, and whoſe ſummits are moſt commonly clothed with ſnow, is their favourite haunt. In this vicinity the ſouthern glens afford them food and ſhelter during the ſeverity of winter; in ſummer, however, the northern aſpect is more congenial to their nature, and admits a wider range. They are a very valuable property to the tribes of itinerant Tartars, called *Duckba*, who live in tents, and tend them from place to place; they at the ſame time afford their herdſmen an only means of conveyance, a good covering, and wholeſome ſubſiſtence. They are never employed in agriculture, but are extremely uſeful as beaſts of burden, for they are ſtrong, ſure-footed, and carry a great weight. Tents and ropes are manufactured of their hair, and amongſt the humbler ranks of herdſmen, he has ſeen caps and jackets made of their ſkins. Their tails are eſteemed throughout the eaſt, as far as luxury and parade have any influence on the manners of the people; and on the continent of India they are found, under the denomination of chowries, in the hands of the meaneſt grooms, as well as occaſionally in thoſe of the firſt miniſter of ſtate. They are in univerſal uſe for driving away winged inſects, flies, and muſketoes, and are employed as ornamental furniture upon horſes and elephants; yet the beſt requital with which the care of their keepers is at length rewarded, for ſelecting them good paſtures, is in the abundant quantity of rich milk which they give, and the butter produced from it, which is moſt excellent. It is their cuſtom to preſerve this in ſkins or bladders, and the air being thus excluded from it, it will keep in this cold climate throughout the year; ſo that, after ſome time tending their herds, when a ſufficient ſtore is accumulated, it remains only to load their cattle, and drive them to a proper market with their own produce, which conſtitutes, to the utmoſt verge of Tartary, a moſt material article of commerce.

Dr Pallas informs us, that the calves of this ſpecies, when firſt born, are covered with a ſtrong woolly hair, reſembling that of a water ſpaniel, and that in about three months they begin to acquire the long hair of the throat, lower parts, and tail.

This animal was deſcribed by Ælian, under the name of Poephagus.

This order contains eight genera and about 82 ſpecies.

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Genus 45. EQUUS. *Horſe.* 152 Equus.

Front teeth in the upper jaw ſix, parallel. In the lower jaw, ſix, ſomewhat projecting. Canine teeth, one on each ſide, in both jaws, remote from the reſt. Feet with undivided hoofs.

Dr Shaw enumerates ſix ſpecies, viz. 1. * *Equus Caballus*, The Horſe.—Tail uniformly covered with long hair.—2. *E. Hemionus*, Jickta. Of an uniform colour, without a diſtinct humeral croſs, with naked tail haired at the tip.—3. * *E. Aſinus*, Aſs. Blackiſh croſs over the ſhoulders, and tail tipped with long hair.—4. *E. Zebra*, Zebra. Variegated with numerous dark brown ſtripes.—5. *E. Quagga*, Quagga. Rather rufty, which is grey, striped above with brown. Spotted towards the hind parts.—6. *E. Bisulcus*, Cloven-footed H. [illegible].

1. *E. Caballus*, Common H.—Though it is in a state of domestication that we are chiefly to consider this noble animal, we must first, however, mention a few circumſtances reſpecting him in his native ſtate of liberty.

Herds are found wild in ſeveral parts of the globe. Large herds of them are occaſionally ſeen in the ſouthern parts of Siberia, and in the great Mongolian deſerts, among the Kalkas to the north-weſt of China. They are alſo found in the deſerts on each ſide the river Don; but it is ſuppoſed that theſe are deſcended from the Ruſſian horſes employed in the ſiege of Azoph, in the year 1697, who being turned looſe for want of forage, eſcaped into the deſerts, and their deſcendants have gradually acquired the appearance of native wild ones.

The horſe in its wild ſtate is conſiderably ſmaller than moſt of our domeſtic horſes, and poſſeſſes much leſs ſymmetry of form. He is extremely ſwift, active and vigilant, and like ſome other tribes of animals, theſe horſes have always a centinel, who by a loud neigh gives notice to the herd of approaching danger, when they all gallop off with aſtoniſhing rapidity.

In South America there are alſo found large herds of wild horſes; but theſe are of Spaniſh origin, derived from thoſe that were carried over by the firſt conquerors of America. They are now become ſo numerous as to live in herds, ſome of which are ſaid to conſiſt of 10,000. As ſoon as they perceive domeſtic horſes in the fields, they gallop to them, careſs, and by a kind of grave and prolonged neighing, invite them to run off. The domeſtic horſes are ſoon ſeduced, unite themſelves to the independent herd, and depart along with them. It happens not unfrequently that travellers are ſtopped on the road by the effect of this deſertion. To prevent this, they halt as ſoon as they perceive theſe wanderers, watch their own horſes, and endeavour to frighten away the others. In this caſe the wild horſes reſort to ſtratagem; ſome are detached before, and the reſt advance in a cloſe column, which nothing can interrupt. If they are ſo alarmed as to be obliged to retire, they change their direction, but without ſuffering themſelves to be diſperſed. Sometimes they make ſeveral turns round thoſe they wiſh to ſeduce, in order to frighten them, but they often retire after making one turn. When the inhabitants wiſh to convert ſome of theſe wild horſes into domeſtic ones, which they find not very difficult to be done, perſons mounted on horſeback attack a troop of them, and when they approach them, they throw ropes with great care round their legs, which prevent them from running away. When brought home they are tied with a halter to a ſtake or tree, without food or drink, for two or three days. After this they are cut, and then broke in the ſame manner as the domeſtic horſes. They ſoon become docile, but if not carefully watched, will again join their wild friends.

The attention with which the wild horſes of Siberia protect their young, is finely exemplified in a communication by a gentleman in that country to the editor of the Bee. The wild horſe, he ſays, though a gregarious animal, does not go in promiſcuous flocks like cattle or ſheep; but each male chooſes for himſelf a certain number of females, with whom alone he aſſociates during the whole year, beating off every other male which offers to approach them. The ſtrongeſt of courſe has the beſt haram, and the weaker are obliged to go without any. But when he has once fixed himſelf, he defends his own property, never attempting to encroach on that of another. The battles that are fought for the females at the beginning of the ſeaſon are furious, and often prove fatal to one of the parties; but when the victory is once decided, the weakeſt never afterwards for that ſeaſon diſpute for ſuperiority.

The horſe, when he has once obtained his females, governs them with deſpotic authority. Whenever he calls upon them they muſt obey, otherwiſe they are puniſhed ſeverely; and the mares are ſo ſenſible of this, that they diſcover every ſymptom of the moſt perfect obedience to their lord and maſter.

His government, however, is founded on love, and his authority is exerciſed, rather for the protection of his ſubjects, than their injury. The great enemy they have there to dread is the wolf; and if the horſe did not take care to keep them cloſe together, ſo as to receive the benefit of his protection, they would be ſoon exterminated. It is the foals only that the wolf ever attacks, and againſt his attacks they are much upon their guard. When they ſee any appearance of danger, the horſe gives the call, and they all inſtantly gallop up to him. The foals are then put all together, and the mares laying their heads together above the foals, form a circle all round with their heels outward, ready to ſtrike their enemy if he approaches. The horſe in the mean time remains without the circle to be ready to attack wherever the danger ſhall be greateſt. One wolf dares never make the attack by himſelf. When they come up, the horſe gallops round his family, trampling to death every one he can reach, or tearing them with his teeth; and ſo ſtrong is his bite when thus enraged, that they frequently have been known, with a ſingle gnaſh of their teeth, to break the back of a wolf, and to kill him entirely. It ſeldom happens that the wolves prevail in this conteſt; and they ſo much dread the power of this noble animal, that they ſeldom make the attack unleſs when they are much pinched with hunger.

This breed of horſes, though nimble and active, are not of a very large ſize. The hunting of theſe horſes, which is only attempted by the natives for catching them alive, eſpecially the young ones, is attended with difficulty and danger, and muſt not be attempted without due precautions *.

In a domeſtic or improved ſtate, the horſe is found in almoſt every country of the world, except within the Arctic circle; but he is found in his higheſt perfection in Arabia, where he ſeems as little degenerated in his race and powers as the lion or tyger of the African foreſts. To the Arabian hordes the horſes are as dear as their children; and the conſtant intercourſe ariſing from living in the ſame tent with their owner and his family, creates a familiarity that could not otherwiſe be effected, and a tractability that ariſes only from the kindeſt uſage. They are the fleeteſt animals of the deſert, and are ſo well trained as to ſtop in their

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* Bee, vol. xvii. p. 95.

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moſt rapid courſe, by the ſlighteſt check of the rider. Unaccuſtomed to the ſpur, the leaſt touch with the foot ſets them again in motion, and ſo obedient are they to the rider's will, as to be directed in their courſe merely by the motion of a ſwitch. They form the principal riches of many of the Arab tribes, who uſe them both in the chaſe and in their plundering expeditions. In the day time they are generally kept ſaddled at the door of the tent, prepared for any excurſion their maſter may take. They never carry any heavy burdens, or are employed on long journeys. Their conſtant food, except in ſpring, when they get a little graſs, is barley, which they are ſuffered to eat only during the night. The Arab, his wife, and children, always lie in the ſame apartment with the mare and foal, who, inſtead of injuring them, ſuffer the children to reſt on their necks and bodies without incommoding them in the leaſt. The poor gentle animals even ſeem afraid to move leſt they ſhould hurt them. The Arabs never beat or correct their horſes, but always treat them with the utmoſt kindneſs. They talk to and reaſon with them.

The whole ſtock of a poor Arabian of the deſert conſiſted of a beautiful mare; this the French conſul at Saïd offered to purchaſe, with an intention to ſend her to Louis XIV. The Arab, preſſed by want, heſitated for a long time, but at length conſented, on condition of receiving a very conſiderable ſum of money, which he named. The conſul wrote to France for permiſſion to cloſe the bargain, and having obtained it, ſent immediately to the Arab the information. The man, ſo poor as to poſſeſs only a miſerable rag, a covering for his body, arrived with his magnificent courſer, and looking firſt at the gold, and then ſtedfaſtly at his mare, heaved a deep ſigh. "To whom is it (he exclaimed) that I am going to yield thee up? To Europeans! who will tie thee cloſe, who will beat thee, who will render thee miſerable. Return with me, my beauty, my jewel! and rejoice the hearts of my children!" As he pronounced the laſt words, he ſprang upon her back, and was out of ſight almoſt in a moment.

The horſes of France are thus characterized by Buffon. Thoſe of Bretagne are pretty ſtrongly made, and have generally black hair, or brown bay; and they have good legs and feet, with a hardy mouth, and a head ſhort and fleſhy, but in general they are rather clumſy. The horſes of Franche Compté are ſaid to have the legs of tygers, and belly of a hind; but they are ſhort and thick, and of a middle ſize, being much more proper for drawing than riding. The horſes of Gaſcony are not unlike thoſe of Spain; but they are not ſo handſome nor ſo active, and therefore they are more proper to draw carriages. The Limoſin horſes are very vicious, and are good for little till they are ſix years old. Their colour is generally bay, or a bay brown. The horſes of Normandy are much like thoſe of Bretagne; and thoſe of Poitou have good bodies, legs, feet and eyes, but they are far from being handſome.

The horſes of Germany are much better and handſomer than thoſe of the Low Countries. They are of great uſe for carriages, but much more for the army, and for drawing the artillery. They have a great deal of hair, eſpecially about the legs. They are not large, but they are well ſet, and yet they have tender feet. The Hungarian horſes are excellent for the coach, as well as for riding; but they are large, though well proportioned; and they are of all colours, and in general very ſwift.

The Daniſh horſes are low, ſhort, and ſquare; but they have a fine head, and ſhort hair. The horſes of the Low Countries are very fit for the coach, and they are beſt known by the name of *Flanders mares*. The Poliſh horſes are like the Daniſh, only they have not ſo fine a forehead; their colour is generally a bright bay, and that of the outward peel of an onion, and they are fiery and vicious. The horſes of Switzerland are pretty much like thoſe of Germany, which is not ſurpriſing, ſince the Germans purchaſe a great number of them. The horſes of Piedmont are fiery, of a middle ſize, and of all ſorts of colours; their legs are good and handſome, their eyes fine, their ears ſmall, and their mouths good; but they do not carry their heads well.

The horſes of Naples and Italy are generally ill made and lean, and yet they are good and uſeful, for they are light and proper for racing, though not for a long courſe; they never do well in a colder climate. The Spaniſh horſes are very well made and handſome, as well as very active and nimble; they have good eyes, handſome legs and heads, and are eaſily managed; they are alſo good for racing, if they are well kept; however they are not ſo good in northern climates as in their own country. The Turkiſh horſes are of different ſhapes, but they are generally ſwift, though their mouths are bad. Moſt of them are white, though there are other colours, and they are large, hardy, ſtrong, and fit for the road.

The horſes of Barbary, commonly called *barbs*, have ſtrong hoofs, and are more proper for racing than any others whatever; ſome have ſaid they never grow old, becauſe they preſerve their vigour to the laſt. They are excellent ſtallions, and ſome of them are uſed as ſuch in Britain; however, the Arabian horſes are not quite ſo good as the Barbary, though ſome think they are both of the ſame kind; only thoſe that are uſed to the deſerts of Arabia are always in action. The horſes of the Gold coaſt of Guinea are very few in number, and in other parts of that coaſt there are none at all; for many of the negroes, when they have been firſt brought over to our American plantations, have expreſſed great admiration at the ſight of the horſe, and even been afraid to come near one.

The horſes of the Cape were originally brought from Perſia, and they are ſmall, of a cheſnut colour, as the natives of that country are all wild, and could never be tamed. The horſes of China are good, and more particularly thoſe in the province of Yun Nan, for they are vigorous, though rather low. The horſes of the Eluth Tartars are good and full of fire, and their ſize is much the ſame as that of the Poliſh horſes; they are afraid of nothing, not even of lions and tygers, but this perhaps may be owing to uſe. In the country of the Mogul they are very numerous, and of all colours; they are generally of the middle ſize, though ſome are as large and handſome as thoſe of Europe.

The breed of horſes in Great Britain is as mixed as that of its inhabitants. The frequent introduction of foreign horſes has given us a variety, that no ſingle country

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country can boaſt of; moſt other countries produce only one kind, while ours, by a judicious mixture of the ſeveral ſpecies, by the happy difference of our ſoils, and by our ſuperior ſkill in management, may triumph over the reſt of *Europe*, in having brought each quality of this noble animal to the higheſt perfection.

In the annals of *Newmarket*, may be found inſtances of horſes that have literally outſtripped the wind. *Childers* is an amazing inſtance of rapidity, his ſpeed having been more than once exerted equal to 82½ feet in a ſecond, or nearly a mile in a minute. The ſame horſe has alſo run the round courſe at *Newmarket* (which is about 400 yards leſs than four miles) in ſix minutes and 40 ſeconds, in which caſe his fleetneſs is to that of the ſwifteſt *Barb* as four to three. This horſe was allowed to be the fleeteſt that was ever bred in the world; he ſtarted repeatedly at Newmarket againſt the beſt horſes of his time, and was never beaten. He won in different prizes to the amount of nearly 2000l. and was afterwards reſerved as a ſtallion. His ſire was an Arabian, ſent by a gentleman as a preſent to his brother in England. Next to *Childers* was the famous *Eclipſe*, who won prizes to a great amount. *High-flier* was accounted the beſt horſe of his time in England. Though he never ſtarted after he was five years old, he won to the amount of nearly 9,000l. He was never beaten, nor ever paid a forfeit. *Bay Malton*, the property of the late marquis of Rockingham, won, in ſeven prizes, nearly 6000l. At York he ran four miles in leſs than eight minutes.

One of the moſt remarkable inſtances of the work done by poſt-horſes in a ſhort time, is that mentioned by Buffon, of the poſt-maſter of Stretton, who in the year 1745, rode on different horſes along the London road no leſs than 215 miles in 11 hours and a half; a rate of above 18 miles an hour. In July 1788, a horſe belonging to a gentleman of Billeter ſquare, London, was, for a wager, trotted 30 miles in an hour and 25 minutes, which is above 21 miles in an hour.

No country can be compared with ours with reſpect to the ſtrength and ſize of draught horſes, and for the activity and ſtrength of thoſe that form our cavalry. In London there have been inſtances of a ſingle horſe drawing, for a ſhort ſpace, the weight of three tons; and ſome of the pack-horſes of the north uſually carry burdens weighing upwards of 400lb. But the moſt remarkable proof of the ſtrength of the Britiſh horſes is in our mill horſes, ſome of which have been known to carry, at one load, 13 meaſures of corn, that in the whole would amount to more than 900lb. in weight. Our cavalry in the late campaigns, ſhowed over thoſe of our allies, as well as the French, a great ſuperiority both of ſtrength and activity: the enemy was broken through by the impetuous charge of our ſquadrons, while the German horſes, from their great weight, and inactive make, were unable to ſecond our efforts, though thoſe troops were actuated by the nobleſt ardour. The preſent cavalry of this iſland only ſupports its ancient glory; it was eminent in the earlieſt times: our ſcythed chariots, and the activity and good diſcipline of our horſes, even ſtruck terror into Cæſar's legions. It is now impoſſible to trace out this ſpecies, for thoſe which exiſt among the indigenæ of *Great Britain*, ſuch as the little horſes of *Wales* and *Cornwall*, the hobbies of *Ireland*, and the ſhelties of *Scotland*, though admirably well adapted to the uſes of thoſe countries, could never have been equal to the work of war. Thoſe we employ for that purpoſe, or for the draught, are an offspring of the *German* or *Flemiſh* breed, meliorated by our ſoil, and a judicious culture.

The Engliſh were ever attentive to an exact culture of theſe animals, and in very early times ſet a high value on their breed. The eſteem that our horſes were held in by foreigners ſo long ago as the reign of *Athelſtan*, may be collected from a law of that monarch prohibiting their exportation, except they were deſigned as preſents. Theſe muſt have been the native kind, or the prohibition would have been needleſs, for our commerce was at that time too limited to receive improvement from any but the German kind, to which country their own breed could be of no value.

But when our intercourſe with the other parts of Europe was enlarged, we ſoon laid hold of the advantages this gave of improving our breed. *Roger de Belleſme*, earl of Shrewſbury, is the firſt that is upon record. He introduced the Spaniſh ſtallions into his eſtate in *Powisland*, from which that part of Wales was for many ages celebrated for a ſwift and generous race of horſes. *Giraldus Cambrenſis*, who lived in the reign of Henry II. takes notice of it, and *Michael Drayton*, cotemporary with Shakeſpeare, ſings their excellence in the 6th part of his *Polyalbion*. This kind was probably deſtined to mount our gallant nobility, our courteous knights for feats of chivalry, in the generous conteſts of the tilt-yard. From theſe ſprung, to ſpeak the language of the times, the flower of courſers, whoſe elegant form added charms to the rider, and whoſe activity and managed dexterity gained him the palm in that field of gallantry and romantic honour. That this was the chief object of cultivating the mixed breed, is very probable, for racing in its preſent form was not introduced into England till the reign of James I. the earlieſt notice of the diverſion being in that reign. Croyden in the ſouth, and Garterly in Yorkſhire, were then famous horſe courſes. That it was not in vogue in the preceding reign, is reaſonable to imagine, for among the numerous entertainments exhibited at Kenelworth by Elizabeth's favourite on her viſit there, and where no amuſement then practiſed was omitted, we do not find horſe-racing among them.

Not that we deny this diverſion to be known in theſe kingdoms in earlier times; we only aſſert a different mode of it, gentlemen being then their own jockies, and riding their own horſes. Lord Herbert of Cherbury enumerates it among the ſports that gallant philoſopher thought unworthy of a man of honour. "The exerciſe (ſays he) I do not approve of, is running of horſes, there being much cheating in that kind; neither do I ſee why a brave man ſhould delight in a creature whoſe chief uſe is to help him to run away."

As no kingdom can boaſt of parallel circumſtances, ſo none can vie with us in the number of theſe noble quadrupeds. It would be extremely difficult to gueſs at the exact number of them, or to form a periodical account of their increaſe; the number ſeems very fluctuating. Mr William Fitz-Stephen relates, that in the reign of King Stephen, London alone poured out 20,000 horſemen in the wars of thoſe times; yet we find that in the beginning of Queen Elizabeth's reign, the whole kingdom could not ſupply 2000 horſes to

form

[illegible] cavalry; and even in the year 1588, when the nation was in the most imminent danger from the Spaniſh invaſion, all the cavalry which the nation could then furniſh amounted only to 3000. To account for this difference we muſt imagine, that the number of horſes which took the field in Stephen's reign were no more than an undiſciplined rabble: the few that appeared under the banners of Elizabeth, a corps well formed, and ſuch as might be oppoſed to ſuch a formidable enemy as was then expected. But ſuch is their preſent increaſe, that in a late war, the number employed was 13,575; and ſuch is our improvement in the breed of horſes, that moſt of thoſe which are uſed in our waggons and carriages of different kinds, might be applied to the ſame purpoſe. Of theſe our capital alone employs near 22,000.

Of all quadrupeds, ſays Buffon, the horſe, together with grandeur of ſtature, poſſeſſes the greateſt elegance and proportion of parts. If we compare him with the animals immediately above and below him, we ſhall find that the aſs is ill-made; that the head of the lion is too large; the limbs of the ox too ſhort and ſlender: that the camel is deformed, and the elephant a ſhapeleſs maſs. The regularity and proportion of the parts of his head, give him a light and ſprightly aſpect, which is well ſupported by the beauty of his cheſt. He elevates his head as if anxious to exalt himſelf above the condition of quadrupeds, and in this noble attitude he beholds man face to face.

We ſhall here give Buffon's deſcription of what he conſiders as a perfect horſe: but that this and ſimilar deſcriptions may be better underſtood, we ſhall premiſe an explanation of the technical terms commonly employed in deſcribing a horſe. The figures prefixed to the terms refer to fig. 72. Plate CCCXIII. *The fore part.* 1. The forehead. 2. The temples. 3. Cavity above the eye. 4. The jaw. 5. The lips. 6. The noſtrils. 7. The tip of the noſe. 8. The chin. 9. The beard. 10. The neck. 11. The mane. 12. The fore-top. 13. The throat. 14. The withers. 15. The ſhoulders. 16. The cheſt. 17. The elbow. 18. The arm. 19. The plate vein. 20. The cheſnut. 21. The knee. 22. The ſhank. 23. The main tendons. 24. The fetlock joint. 25. The fetlock. 26. The paſtern. 27. The coronet. 28. The hoof. 29. The quarters. 30. The toe. 31. The heel.——*The body.* 32. The reins. 33. The fillets. 34. The ribs. 35. The belly. 36. The flanks.——*The hind part.* 37. The rump. 38. The tail. 39. The buttocks. 40. The haunches. 41. The ſtifle. 42. The thighs. 43. The hock. 44. The kerb. 45. The point of the hock.

When the horſe is without blemiſh, ſays Buffon, the legs and thighs are clean, the knees ſtraight, the ſhin and ſhank thin, and the back ſinew ſtrong and well braced. The ſinews and the bones ſhould be ſo diſtinct, as to make the legs appear thin and lathy, not full and round. The paſtern joints ſhould never be large and round; nor muſt there be any ſwelling near the coronet. The hock ſhould be lean and dry, not puffed up with wind. With regard to the hoof, the coronet ſhould be equally thick, and the horn ſhining and grayiſh. A white horn is a ſign of a bad hoof, for it will wear out in a ſhort time; and likewiſe when the horn is thin, it is liable to be ſpoiled in ſhoeing, and by travelling hard on ſtony grounds. This is beſt known when the ſhoe is taken off, for then the verge all round the ſole will appear thin, and the horſe will wince at the leaſt touch of the pincers.

A ſtrong foot has the fibres of the hoof very diſtinct running in a direct line from the coronet to the toe, like the grain of wood. In this caſe, care muſt be taken to keep the feet moiſt and pliable. [illegible] a hard dry hoof, is [illegible] ſubject to rifts and fiſſures, which cleave the hoof quite through ſometimes from the coronet down to the bottom.

A narrow heel is likewiſe a defect; and when it is not above two fingers in breadth, the foot is bad. A high heel cauſes a horſe to trip and ſtumble often; and the low one, with long yielding paſterns, is very apt to be worn quite away on a journey. Too large a foot in proportion to the reſt of the body, renders a horſe weak and heavy.

The head of a horſe ſhould be ſmall, and rather lean than fleſhy. The ears ſhould be ſmall, erect, thin, ſprightly, and pointed. The forehead, or brow, ſhould have a ſtar or ſnip thereon. The noſe ſhould riſe a little, and the noſtrils ſhould be wide that he may breathe more freely. The muzzle ſhould be ſmall, and the mouth neither too deep nor too ſhallow. The jaws ſhould be thin, and not approach too near together at the throat, nor too high upwards towards the onſet, that the horſe may have ſufficient room to carry his head in an eaſy graceful poſture. The eyes ſhould be of a middle ſize, bright, lively, and full of fire. The tongue ſhould be ſmall, that it may not be too much preſſed on by the bit; and it is a good ſign when his mouth is full of white froth, as it ſhews that he will not ſoon be overheated.

The neck ſhould be arched towards the middle, growing ſmaller by degrees from the breaſt and ſhoulders to the head. The hair of the mane ſhould be long, ſmall, and fine, and it will not be amiſs if it be a little frizzled. The ſhoulders ſhould be pretty long, the withers thin, and ſhould gradually enlarge downwards, but ſo as to render the breaſt neither too narrow nor too thick. A thick-ſhouldered horſe ſoon tires, and trips and ſtumbles every minute, eſpecially if he has at the ſame time a thick, large neck. When the breaſt is ſo narrow that the fore thighs almoſt touch, the horſe is never good for much. A horſe of a middle ſize ſhould have the diſtance of five or ſix inches between his fore thighs, and there ſhould be leſs diſtance between his feet than his thighs near the ſhoulders when he ſtands upright.

The body or carcaſe of a horſe ſhould be of a middling ſize in proportion to his bulk, and the back ſhould ſink a little below the withers; but the other parts ſhould be ſtraight, and no higher behind than before. He ſhould alſo be home-ribbed, but the ſhort ribs ſhould not approach too near the haunches, and then he will have room to fetch his breath. When a horſe's back is ſhort in proportion to his bulk, and yet otherwiſe well limbed, he will hold out a journey, though he will travel ſlow. When he is tall, with very long legs, he is but of little value.

The wind ſhould never be overlooked in the choice of a horſe, and it may eaſily be known by his flanks, whether he is broken-winded, when he ſtands quiet in the ſtable:

[illegible]

The temper of a horſe ſhould always be obſerved: a vicious horſe generally lays his ears cloſe to his poll, ſhows the white of his eyes, and looks ſullen and dogged. An angry horſe may be known by his [illegible] in a poſture of defence. When he is very vicious, he pays no regard to the perſon that feeds him, though ſome horſes that are ticklith will lay back their ears, without being of a bad diſpoſition. A fearful horſe is apt to ſtart, and never leaves off till he is old and uſeleſs. A fretful horſe is very unfit for a journey, and you may diſcover his temper as ſoon as he gets out of the ſtable. A [illegible] horſe may be eaſily known, whatever tricks are uſed to rouſe his ſpirits. With regard to the colour of a horſe, the bright bay, and indeed all bays in general, are accounted good colours. The cheſnut horſe is generally to be preferred to the ſorrel, unleſs the former happens to be party-coloured with white legs. Brown horſes have generally black manes and tails, and their joints are of a ruſty black. Thoſe of this colour that are dapple are much handſomer than the reſt. Horſes of a ſhining black, and well marked without too much white, are in high eſteem for their beauty. A ſtar, or blaze, or white muzzle, or one or more feet tipped with white, are generally thought to be rather better than thoſe that are quite black.

Of grays, the dappled are accounted beſt, though the ſilver gray make a more beautiful appearance, and often prove good. The iron gray with white manes and tails, are thought not to be ſo hardy. Grays of every kind will turn white ſooner or later; but the nutmeg gray, when the dappled parts incline to bay or cheſnut, are ſaid to be good hardy horſes. Roan horſes have a diverſity of colours mixed together; but the white is more predominant than the reſt. They are all generally hardy, and fit for the road; and ſome are exceeding good. Thoſe of a ſtrawberry colour moſt reſemble the ſorrel, and they are often marked with white on the legs and face. When the bay is blended with it, he ſeems to be tinctured with claret, and ſome of theſe prove to be very good. Dun, ſallow, and cream-coloured horſes have a liſt down their backs, and their manes and tails are black. Dun horſes are ſeldom choſen by gentlemen, and yet they may be very uſeful to the country farmer. The ſallow and cream coloured are more eſteemed, both for beauty and uſe. Thoſe horſes that are finely ſpotted with gray colours like leopards are a great rarity, and for that reaſon they are only in the hands of great men.

As in this country the form of the race-horſe is more particularly attended to, we ſhall give the following rules for the beſt proportions of race-horſes, as laid down by Mr Feron.

"It has been obſerved by ſeveral authors, with good authority, that the head of a horſe, divided into 22 equal parts, is the common meaſure for every part of the body; but if the head ſhould appear too long or too ſhort, that meaſure muſt be abandoned, to take the height of the body from the top of the withers to the ground. The third part of this [illegible]

"A horſe well made and beautiful in his fore hand, ſhould meaſure [illegible] head to the ground, the head ſtanding in its natural poſition,—the neck ſhould [illegible] from the withers to the top of the head,—the ſame meaſure gives the length [illegible] head to its termination [illegible] body ſhould meaſure [illegible] the ground—we obſerve the ſame meaſure from the rump to the ground,— the length of the body ſhould meaſure three heads and four parts, from the point of the ſhoulder to the poſterior part of the buttock.

"The line which falls from the articulation of the ſhoulder with the arm, ſhould meaſure two heads and ſeven parts. This line muſt directly touch the hoof in front of the toe. If the foot ſhould ſtand before this line, the leg will be in an oblique direction forward, which ſtructure will confine the [illegible] actions, becauſe the fore legs are obliged to come upon the ground nearly the ſame way as thoſe of a horſe going down hill; that is to ſay, the heels will touch the ground firſt, inſtead of the toes; but if the legs ſtand obliquely backwards from above, which is the oppoſite defect, the caſe is a great deal worſe, becauſe the animal is continually ſtumbling or even falling, on account of his feet being drawn too much under the belly, which ſituation obliges him to ſupport too great a weight of the body. When this defect originates from the knees only, it bends the legs more or leſs, in which caſe the horſe is called bow-legged. In either caſe ſuch an animal muſt be rejected, and conſidered as unfit for a racer.

"The line which falls from the top of the fore leg to the point of the heel, ſhould meaſure one head and 20 parts. This line is extended to ſhow the perfect perpendicular poſition of the whole limb. The diſtance from the top of the withers to the ſtifle ſhould meaſure one head and 20 parts; the ſame meaſure gives the diſtance from the rump to the elbow, or *vice verſa*. The width of the neck ſhould meaſure one head, taken from the top of the withers to the point of the ſhoulder.

"The narroweſt part of the neck, and the breadth of the head taken a little below the eyes, meaſures 12 parts of a head each. The thickneſs of the body, from the middle of the back to the middle of the belly, ſhould be one head and two parts. The ſame line continued to the ground, ſhews the centre of gravity of the horſe's body. The diſtance from the root of the tail to the ſtifle, ſhould meaſure one head and four parts. The ſame meaſure gives the length from the ſtifle to the hock. The ſame meaſure gives the diſtance from the hock to the ground. The breadth of the fore-arm, taken from the anterior parts of the elbow, ſhould meaſure 11 parts of a head. The ſame meaſure gives the breadth of one of the hind-legs, taken juſt under the fold of the buttocks. The breadth of the hock, taken from its anterior part to the top of the os calcis, ſhould meaſure ſeven parts of a head. The ſame meaſure gives the breadth of the head above the noſtrils, meaſured ſideway.

"The breadth of the head, taken from one eye to the other, ſhould meaſure ſeven parts of a head. The ſame meaſure ſhould give the diſtance between the fore legs. The thickneſs of the knees ſhould meaſure five parts of a head. The ſame meaſure gives the breadth of the fore legs, juſt above the knees. The breadth of the hind ſtifle joints ſhould meaſure four parts of a head. The breadth of the fore paſterns ſhould meaſure 2¾ parts of a head. The breadth of the coronet ſhould meaſure 4½ parts of a head. The breadth of the hinder legs at ſhank bones, ſhould meaſure three parts of a head. The breadth of the fore legs ſhould meaſure 2¾ parts of a head. The perpendicular line which falls from the articulation of the ſtifle, ſhould touch the ground at the diſtance of half a head from the toe. Too far or too near this direction, proves the hock defective. If the hind feet advance too much under the belly, the hocks muſt be proportionably bent, and the weight of the body overcharging them, will of courſe increaſe the deformity. The feet being too much under the belly, will render it impoſſible for them to cover much ground; therefore their ſteps will be very much confined. The extenſion of the hocks terminating almoſt in an upright direction, will rather ſerve to raiſe the body than to puſh it forward. If, on the contrary, the hind feet ſtand too far behind this line, the hocks will be too ſtrait, and their flexion too confined. The extenſion of the hinder parts taking place, only in a perpendicular direction backward, will produce a defect capable of retarding their ſpeed *."

The fleſh of the horſe is dark and coarſe; but it has appeared from the accounts we have of long ſieges, that it may be employed for food, and we are aſſured that it is by no means unpalatable. In fact, in ſome countries it is employed as food from choice. In the medical dictionary of the *Encyclopédie Methodique*, art. *Cheval*, tom. iv. p. 696. is a curious account of the mode of preparing an extraordinary part of this animal, that forms an ingredient in ragouts, with which ſome of the Mogul Tartars regale themſelves in their moſt ſplendid entertainments.

The chief uſe to which the remains of the horſe can be applied, is for collars, traces, and other parts of the harneſs; and thus, even after death, he preſerves ſome analogy with his former employment. The hair of the mane is ſometimes uſed in making wigs; that of the tail in making the bottoms of chairs, floor cloths, and cords, and to the angler in making lines.

For ſeveral other particulars reſpecting the horſe, eſpecially on the uſe of that animal among the Jews, on the management of horſes upon and after a journey, and on the breeding of horſes, ſee the article HORSE. On the uſe of horſes in huſbandry, with a comparative view of the profits ariſing from them and oxen, ſee the article AGRICULTURE, Part III.; for a ſhort account of the anatomical ſtructure of the horſe, ſee FARRIERY, Part II.; for various methods of ſhoeing horſes, and ſeveral other operations, ſee the ſame article, Part III; for the beſt method of conſtructing ſtables, and the moſt proper food of horſes, ſee Part IV. and for the deſcription and treatment of the diſeaſes incident to horſes, with the remedies employed, ſee Parts VI. and V. of the ſame article; and for the art of riding, training, and managing horſes, ſee HORSEMANSHIP.

3. E. *Aſinus*, the Aſs.—It is unneceſſary to deſcribe the appearance of the domeſtic aſs; but as this animal in his native ſtate of wildneſs differs conſiderably from him who is the ſlave of man, we ſhall give a ſhort deſcription of the wild-aſs.

Its uſual colour is ſaid to be white, or a pale ſilvery gray, with a ſlight ſhade of ſtraw colour on the ſides of the neck and body. Along the back runs a deep brown ſtripe of thickiſh wavy hair, to the beginning of the tail; this ſtripe is croſſed over the ſhoulders, as in the tame animal, by another of ſimilar colour; but it is ſaid that this is peculiar to the male. The neck is furniſhed with a brown mane three or four inches long, conſiſting of ſoft woolly hair; the tail is tufted at the end by duſky hairs of about ſix inches in length; the forehead is arched, and the ears erect, pointed, and lined internally with white curling hairs. It ſtands higher on its limbs than the domeſticated animal, and its legs are more ſlender in proportion. The hair on the whole body is very fine, bright, ſoft, and ſilky; and on ſome parts is marked by a few obſcure undulations of a darker ſhade than the reſt. Thoſe which are found in Africa are ſaid to be of a pale aſh colour, rather than of the caſt above deſcribed.

The food of the wild aſs conſiſts chiefly of ſaline, or bitter and lacteſcent plants. It is alſo fond of ſalt or brackiſh water. The manners of theſe animals very much reſemble thoſe of the wild horſe. They aſſemble in troops under the conduct of a leader, and are extremely ſhy and vigilant, and, like the former animals, dart off with the utmoſt rapidity on the ſight of mankind. They have been at all times celebrated for their ſwiftneſs. Their voice reſembles that of the common aſs, but is ſomewhat ſhriller.

Wild aſſes are found in ſeveral parts of Aſia, eſpecially in the dry and mountainous deſerts of Tartary, and in the ſouthern parts of India and Perſia. Large herds of them are alſo found in South America, where they were originally introduced by the Spaniards, and as the climate ſeems peculiarly favourable to them, they have multiplied to ſo great a number, as in ſome places to have become quite a nuiſance. In the kingdom of Quito they are hunted for the purpoſe of domeſtication, and the hunting is conducted in the following manner.

A number of perſons go on horſeback, and are attended by Indians on foot. When arrived at the proper places, they form a circle in order to drive them into ſome valley, where, at full ſpeed they throw the nooſe and endeavour to halter them. The creatures, finding themſelves incloſed, make very furious efforts to eſcape; and if only one forces his way through, they all follow with an irreſiſtible impetuoſity. However, when nooſed, the hunters throw them down and ſecure them with fetters, and thus leave them till the chaſe is over. Then, in order to bring them away with greater facility, they pair them with tame aſſes; but this is not eaſily performed, for they are ſo remarkably fierce, that they often wound the perſons who undertake to manage them.

They have all the ſwiftneſs of horſes, and neither declivities nor precipices can retard their career. When attacked, they defend themſelves with their heels and mouth with ſuch addreſs, that without ſlackening their pace, they often maim their purſuers. But the moſt remarkable property in theſe creatures is, that, after carrying their firſt load, their celerity leaves them, their

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* Feron's Farriery, p. 28.

Belluæ.

the Species.

dangerous ferocity is loſt, and they ſoon contract the ſtupid look and the dullneſs peculiar to their ſpecies. It is is alſo obſervable that theſe creatures will not permit a horſe to live among them. They always feed together, and if a horſe happens to ſtray into the place where they graze, they all fall upon him, and without even giving him the choice of dying, bite and kick him till they leave him dead on the ſpot.

Though the aſs is at preſent naturalized in this country, his introduction into Britain ſeems to have been very late, as he was entirely loſt among us during the reign of Queen Elizabeth, when, as Hollinſhed informs us, "our lande did yeelde no aſſes."' There is, however, no reaſon to ſuppoſe that the aſs was unknown among us ſome hundred years before, as we find mention made of him ſo early as the time of Athelred, and again in the reign of Henry III. ſo that the loſs of them during the reign of Queen Elibabeth muſt have been owing to ſome accident. They were probably introduced again under the ſucceeding reign, when we renewed our intercourſe with Spain, in which country this animal is much uſed, and where it has been brought to great perfection.

The qualities of this animal are ſo well known as to need no deſcription. His gentleneſs, patience, and perſeverance, are without example. He is temperate with regard to food, and eats contentedly the coarſeſt and moſt neglected herbage. If he give the preference to any vegetable, it is to the plantane, for which he will neglect every other herb in the paſture. In his water he is ſingularly nice, drinking only from the cleareſt brooks. He is ſo much afraid of wetting his feet, that, even when laden, he will turn aſide to avoid the dirty parts of the road.

He is ſtronger, in proportion to his ſize, than the horſe, but more ſluggiſh, ſtubborn, and untractable. He is healthier than the horſe, and of all other quadrupeds is leaſt infeſted with lice or other vermin; probably owing to the extreme hardneſs and dryneſs of his ſkin. For the ſame reaſon, perhaps, he is leſs ſenſible of the goads of the whip, or the ſtinging of flies.

He is three or four years in coming to perfection, and lives to the age of 20, or ſometimes 25 years. He ſleeps much leſs than the horſe, and never lies down for that purpoſe but when he is much fatigued. The ſhe-aſs goes 11 months with young, and ſeldom produces more than one at a time.

In pleading the cauſe of this injured and neglected animal, we cannot do better than copy the eulogy of the abbé la Pluche.

"I confeſs (ſays he) that the aſs is not maſter of very ſhining qualities, but then he enjoys thoſe that are very ſolid. If we reſort to other animals for diſtinguiſhed ſervices, this at leaſt furniſhes us with ſuch as are moſt neceſſary. His voice is not altogether melodious, nor his air majeſtic, nor his manners very lively; but then a fine voice has very little merit with people of ſolidity. With him the want of a noble air has its compenſation in a mild and modeſt countenance; and inſtead of the boiſterous and irregular qualities of the horſe, which are frequently more incommodious than agreeable, the behaviour of the aſs is entirely ſimple and unaffected; no ſupercilious and ſelf-ſufficient airs. He marches with a very uniform pace, and though he is not extraordinarily ſwift, he purſues his journey for a long time, and without intermiſſion. He finiſhes his work in ſilence, ſerves you with a ſteady perſeverance, and diſcovers no oſtentation in his proceedings, which is certainly a conſiderable accompliſhment in a domeſtic. His meat requires no preparation, for he is perfectly well contented with the firſt thiſtle that preſents itſelf in his way. He does not pretend that any thing is due to him, and never appears ſqueamiſh or diſſatisfied: he thankfully accepts whatever is offered to him; he has an elegant reliſh for the beſt things, and very civilly contents himſelf with the moſt indifferent. If he happens to be forgotten, or is faſtened a little too far from his fodder, he entreats his maſter, in the moſt pathetic language he can utter, to be ſo good as to ſupply his neceſſities. It is very juſt that he ſhould live, and he employs all his rhetoric with that view. When he has finiſhed his expoſtulations, he patiently waits the arrival of a little bran, or a few withered leaves; and the moment he has diſpatched his meal, he returns to his buſineſs, and marches on without a murmur or reply. His occupations have a tinge of the meanneſs of thoſe who ſet him to work; but the judgements that are formed, both of the aſs and his maſter, are equally partial. The employments of a judge, a man of conſequence, and an officer of the revenue, have an important air, and their habit impoſes on the ſpectators. On the contrary, the labour of the peaſant has a mean and contemptible appearance, becauſe his dreſs is poor and his condition deſpiſed. But we really make a falſe eſtimation of theſe particulars. It is the labour of the peaſant which is moſt valuable, and alone truly neceſſary. Of what importance is it to us when a manager of the revenue glitters from head to foot with gold? We have no advantage from his labours. I confeſs, judges and advocates are, in ſome meaſure neceſſary, but they are made ſo by our folly and miſbehaviour; for they would no longer be wanted, could we conduct ourſelves in a rational manner. But, on the other hand, we could on no account, and in no ſeaſon or condition of life, be without the peaſant and the artizan. Theſe people may be conſidered as the ſouls and ſinews of the community, and the ſupport of our life. It is from them we are conſtantly deriving ſome accommodations for our wants. Our houſes, our habits, our furniture, and our ſuſtenance riſe from their labours. Now, what would become of your vine-dreſſers, gardeners, maſons, and the generality of country people, that is to ſay, of two thirds of all mankind, if they were deſtitute of men and horſes to convey the commodities and materials which they employ and manufacture? The aſs is perpetually at their ſervice; he carries fruit, herbs, coal, wood, bricks, tiles, plaſter, lime, and ſtraw. The moſt abject offices are his ordinary lot, and it is as ſingular an advantage to this multitude of workmen, as well as to ourſelves, to find a gentle, ſtrong, and indefatigable animal, who, without expence or pride, furniſhes our cities and villages with all ſorts of commodities. A ſhort compariſon will complete the illuſtration of his ſervices, and in ſome meaſure raiſe them from their obſcurity. The horſe very much reſembles thoſe nations who are fond of glitter and hurry; who are perpetually ſinging and dancing, and extremely ſtudious to ſet off their exterior, and mix gaiety in all their actions. They are admirable on ſome diſtinguiſhed and deciſive occaſions, but their fire frequently degenerates into [illegible] make them ridiculous; they fall into wild transports; they extol all their own works, and lose the most favourable conjunctures for want of management and moderation. The ass, on the contrary, resembles those people who are naturally heavy and peaceable, whose understanding and senses are confined to husbandry or commerce, and who proceed in the same track without discomposure, and accomplish, with a positive air, whatever they have once undertaken."

The ſkin of this animal is very hard and elaſtic, and may be uſed for drums, ſhoes, and many other purpoſes. It is, we believe, ſeldom employed, except for the leaves of pocket memorandum books. The fleſh of the wild ass is said to be good food, and eaſy of digeſtion.

The he-aſs and the mare readily breed together, but the commerce between the ſtallion and the ſhe-aſs is ſaid to be difficult. The produce of either connexion is the common mule, an animal ſuperior both to the horſe and aſs for travelling over wild and mountainous tracts of country.

The common mule is very healthy, and will live above 30 years. It is found very ſerviceable in carrying burthens, particularly in mountainous places, where horſes are not ſo ſure-footed. The ſize and ſtrength of our breed have lately been much improved by the importation of Spaniſh male aſſes; and it were much to be wiſhed, that the uſeful qualities of this animal were more attended to; for, by proper care in its breaking, its natural obſtinacy would in a great meaſure be corrected; and it might be formed with ſucceſs, for the ſaddle, the draught, or the burthen.

People of the firſt quality in Spain are drawn by mules, where 50 or 60 guineas is no uncommon price for one of them; nor is it ſurpriſing, when we conſider how far they excel the horſe in travelling in a mountainous country, the mule being able to tread ſecurely where the former can hardly ſtand. Their manner of going down the Alps, Andes, &c. is very extraordinary. In theſe paſſages, on one ſide, are ſteep eminences, and on the other frightful abyſſes; and as they generally follow the direction of the mountain, the road, inſtead of lying in a level, forms at every little diſtance ſteep declivities of ſeveral hundred yards downward. Theſe can only be deſcended by mules, and the animal itſelf ſeems ſenſible of the danger, and the caution to be uſed in ſuch deſcents. When they come to the edge of one of theſe precipices, they ſtop without being checked by the rider, and if he inadvertently attempt to ſpur them on, they continue immoveable. They ſeem all this time ruminating on the danger that lies before them, and preparing themſelves for the encounter. They not only attentively view the road, but tremble and ſnort at the danger. Having prepared for the deſcent, they place their fore feet in a poſture as if they were ſtopping themſelves; they then alſo put their hind feet together, but a little forward, as if they were going to lie down. In this attitude, having as it were, taken a ſurvey of the road, they ſlide down with the ſwiftneſs of a meteor. At this time, all the rider has to do is to keep himſelf faſt on the ſaddle without checking the reins, for the leaſt motion is ſufficient to deſtroy the equilibrium of the mule, in which caſe both he and his rider would periſh. The addreſs of theſe animals in this rapid deſcent is truly wonderful, for in their ſwifteſt motion, when they ſeem to have loſt all government of themſelves, they follow exactly the different windings of the road, as if they had previouſly ſettled in their minds the route they were to follow, and had taken every precaution for their ſafety. On theſe occaſions the natives place themſelves along the ſides of the mountains, and holding by the roots of trees, they animate the beaſts with ſhouts, and encourage them to perſevere. Some mules after having been long uſed in ſuch journeys, acquire a ſort of reputation for their ſafety and ſkill, and their value riſes in proportion to their celebrity *.

Belluæ.

Mules very rarely breed among each other, or with horſes or aſſes, but a few inſtances of this kind have occurred.

156 Zebra. Fig. 75.

4. *E. Zebra*, the Zebra.—This may be conſidered as the moſt beautiful animal of the horſe tribe, but it is that ſpecies with which we are leaſt accquainted. It is wild in its nature, and ſo ſwift in its motions, that it can ſeldom be taken.

In ſize the zebra commonly equals the aſs, and it is often conſiderably larger. Its form is much more elegant than that of the aſs; its head and ears being well ſhaped, and of a moderate ſize. What, however, chiefly diſtinguiſhes this animal, is the beauty and ſymmetry of its colours. The ground of the ſkin is either a pure white, or cream colour, ſometimes with a ſlight ſhade of buff, or a pale ruſty tinge, and the ſkin is ornamented on every part with numerous ſtripes of a black or blackiſh brown colour, diſpoſed with the greateſt regularity, ſo as to produce an appearance as if the animal were decorated with dark ribbands. Theſe ſtripes run tranſverſely on the body and limbs, and in a longitudinal direction down the face. The tail is moderately long, round, rather ſlender, marked with ſmall blackiſh bars, and terminated by a pretty thick tuft of a blackiſh or brown colour.

The zebra is chiefly confined to the hotter parts of Africa, from Ethiopia to the Cape of Good Hope, where there are large herds. In manners they reſemble the wild horſe and aſs, and are exceſſively ſwift and vigilant.

All attempts to tame this animal, ſo as to render it ſerviceable, have been hitherto fruitleſs. Wild and independent by nature, it ſeems ill adapted to ſervitude and reſtraint. If, however, it were taken young, and much care was beſtowed on its education, it might very probably be in a great meaſure domeſticated. A beautiful male zebra, at Exeter change, London, which was afterwards burnt to death by the miſchievous act of a monkey ſetting fire to the ſtraw on which he lay, appeared to have entirely loſt his native wildneſs, and was ſo gentle as to ſuffer a child of ſix years old to ſit quietly on his back, without exhibiting the leaſt ſign of diſpleaſure. He was familiar even with ſtrangers, and received thoſe kind of careſſes that are uſually given to the horſe with evident ſatiſfaction.

One that was, ſome years ago, kept at Kew, ſeemed of a ſavage and fierce nature; no one dared venture to approach it, except the perſon who was accuſtomed to feed it, and who alone could mount on its back. Mr Edwards ſaw this animal eat a large paper of tobacco, paper and all; and was told it would eat fleſh, and any kind of food whatever that was given it. This, however, might proceed from habit or neceſſity in its long voyage to this country; for in a native ſtate theſe

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* Bewick's Quadrupeds.

Zebra.

theſe animals all feed, like horſes and aſſes, on vegetables.

In ſome parts about the Cape, where there are many zebras, there is a penalty of fifty rix-dollars inflicted on any perſon who ſhoots one of them; and wherever any of them happen to be caught alive, they are ordered to be ſent to the governor.

It has been found that the zebra and the aſs will breed together. For the purpoſe of aſcertaining this, an experiment was made in the year 1773 with a zebra that belonged to Lord Clive. No account of this experiment appeared till Mr Nicholſon publiſhed the ſubſtance of ſome anſwers made by Mr Parker to a ſet of queſtions propoſed by Sir Joſeph Banks.

The zebra was firſt covered by an Arabian horſe. For this purpoſe it was found neceſſary to bind her, and ſhe ſhewed great diſguſt. As ſhe did not conceive, an Engliſh aſs was procured, to which ſhe ſhewed a degree of averſion, ſcarcely if at all leſs than to the horſe, and was ſubjected to him by the ſame means. The reſult of this trial not being more favourable than the other, recourſe was had to the extraordinary expedient of painting another aſs ſo as to reſemble the zebra. Complete ſucceſs attended this deception. When the animals were put together, the zebra at firſt appeared ſhy, but ſhe received the embraces of the painted aſs, and conceived. The offspring was a fine large male foal, which was juſt turned of ſix months old at the time of inquiry, namely, December 1773. It reſembled both parents; the father as to make, and the mother as to colour; but the colour was not ſo ſtrong, and the ſtripes on the ſhoulders were more conſpicuous than on any other part. In anſwer to a queſtion directed to that object, the relater ſtates it as his opinion, that it would very probably propagate its ſpecies, as it did not appear at all to be like a mule.

In the courſe of the year after this information was received, his lordſhip died ſuddenly, and the collection of animals was diſpoſed of. Sir Joſeph Banks was then abſent from town; and upon his return he was prevented by this circumſtance, either from purchaſing the animals, or acquiring any further information reſpecting the foal *.

Genus 46. HIPPOPOTAMUS.

Hippopotamus. Fig. 77.

Four front teeth in each jaw, the upper ſtanding diſtant in pairs, lower prominent, the two middle longeſt; canine teeth ſolitary, lower extremity large, long, curved, and obliquely truncated; feet armed at the margin with four hoofs.

There is only one ſpecies, viz. *H. Amphibius*, the Hippopotamus, Hippopotame, or River-Horſe.—The head of this animal is of an enormous ſize, and the mouth extremely wide. The ears are ſmall and pointed, and very thickly lined within with ſhort fine hairs. The eyes and noſtrils are ſmall in proportion to the bulk of the animal; on the lips are ſome ſtrong hairs ſcattered in patches here and there. The hair on the body is very thin, of a whitiſh colour, and ſcarcely diſcernible at firſt ſight. There is no mane on the neck, as ſome writers affirm, but the hairs on that part are rather thicker. The ſkin is very thick and ſtrong, and of a duſky colour. The tail is about a foot long, tapering, compreſſed, and naked; the hoofs are divided into four parts. The legs are ſhort and thick. In bulk it is ſecond only to the elephant, and by ſome writers, is ſaid even to be ſuperior to him. The length of a male has been found to be 17 feet, the circumference of the body 15, the height nearly ſeven, the legs nearly three, the head three and a half, and the girth nearly nine. The mouth, when open, is above two feet wide, and furniſhed with 44 teeth of different figures. The cutting, and particularly the canine teeth of the lower jaw, are very long, and exceedingly hard and ſtrong. The ſubſtance of the canine teeth is ſo white, fine, and hard, that it is preferred to ivory for making artificial teeth. The cutting teeth, eſpecially thoſe of the under jaw, are very long, cylindrical, and chamfered. The canine teeth are alſo long, crooked, priſmatic, and ſharp, like the tuſks of the wild boar. The grinders are ſquare, or oblong, like thoſe of man, and ſo large that one of theſe teeth ſometimes weighs three pounds. The tuſks, according to Dr Sparrman, are 27 inches long. With ſuch powerful arms, and ſuch a prodigious ſtrength of body, the hippopotamus might render himſelf formidable to every animal. But he is naturally of a mild diſpoſition, and is formidable only when provoked. His bulk is ſo great that 12 oxen have been found neceſſary to draw aſhore one that had been ſhot; and it is ſaid that the hide is a load for a camel. Though he delights in the water, and appears to live in it as eaſily as on land, he has not, like the beaver, or otter, membranes between his toes. The great ſize of his belly renders his ſpecific gravity nearly equal to that of water, and enables him to ſwim with eaſe.

Theſe animals inhabit the rivers of Africa, from the Niger to Berg river, many miles north of the Cape of Good Hope. They formerly abounded in the rivers nearer the Cape, but are now almoſt extirpated; and to preſerve the few which are left in Berg river, the governor abſolutely prohibited the ſhooting of them without particular permiſſion. They are not found in any of the African rivers that run into the Mediterranean, except in the Nile, and even there only in Upper Egypt, and in the fens and lakes of Ethiopia, through which the Nile paſſes. From the unwieldineſs of his body and the ſhortneſs of his legs, the hippopotamus is not able to move faſt upon land, and is there extremely timid. When purſued, he takes to the water, plunges in, ſinks to the bottom, and is ſeen walking there at eaſe; he cannot, however, continue there long, without riſing towards the ſurface; and in the day-time is ſo fearful of being diſcovered, that when he takes in freſh air the place is hardly perceptible, as he ſcarcely ventures to put his noſe out of the water. In rivers not frequented by mankind, he is, however, leſs cautious, and there puts his whole head out of the water. If wounded, he will riſe and attack boats or canoes with great fury; and is ſaid frequently to ſink them by biting large pieces out of the ſides; for he is as bold in the water as he is timid on the land. In ſhallow rivers the hippopotamus makes deep holes in the bottom for the purpoſe of concealing his great bulk. When he quits the water, he uſually puts out half his body at once, ſmells and looks around, but ſometimes he ruſhes out with great impetuoſity, and tramples down every thing in his way. During the night he leaves the rivers to graze upon the land, where he eats ſugar canes,

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* Nichol. Journ. 4to. vol. ii. 151

[illegible], millet, &c. confuming great quantities, and doing much damage in the cultivated fields. As he is so timid on land, it is, however, not difficult to drive him off. The Egyptians (as Mr Haſſelquiſt informs us) have a curious method of freeing themſelves in ſome meaſure from this deſtructive animal. They mark the places he frequents moſt, and there lay a large quantity of peaſe: when the animal comes on ſhore hungry and voracious, he falls to eating what is neareſt him, and, filling his belly with peaſe, they occaſion an inſupportable thirſt; he then returns immediately into the river, and drinks large draughts of water, which by ſwelling the peaſe, cauſe his ſudden death; for not long after the Egyptans find him dead on the ſhore, blown up as if killed with ſtrong poiſon. He alſo feeds on the roots of trees, which he looſens with his great tuſks; but he never feeds on fiſh. Theſe animals ſleep on the reedy iſlands in the middle of the ſtream, and here they bring forth their young. There is but one male to a herd of females: theſe bring forth one young at a time on the land, but they ſuckle them in the water.

They are generally taken in pit-falls, and the poor people eat their fleſh. Indeed the fleſh of the young animals or calves, as they are called, is eſteemed a dainty by the natives. In ſome parts they place in their corn grounds boards full of ſharp irons, which theſe beaſts ſtrike into their feet, and thus become an eaſy prey. Sometimes they are taken in the water by ſtriking them with harpoons faſtened to cords, and 10 or 12 canoes are employed in the chaſe. The hippopotamus was known to the Romans. Scaurus treated the people with the ſight of five crocodiles and one hippopotamus during his edileſhip, and exhibited them in a temporary lake. Auguſtus produced one at his triumph over Cleopatra.

This animal is the behemoth of Job, who admirably deſcribes its manners, food, and haunts. *Vid.* chap. xl. ver. 15.

For an anatomical account of the ſkeleton of the hippopotamus by Cuvier, ſee *Ann. de Muſ. Nat.* tom. iv. p. 299.

158 Tapir.

Genus 47. TAPIR. *TAPIR.*

Front teeth in both jaws 10. Canine teeth in both jaws ſingle, incurvated. Grinders in both jaws five on each ſide, very broad. Feet with three hoofs and a falſe hoof on the fore feet.

There is only one ſpecies, viz.

159 Americanus. Fig. 78. *T. Americanus*, American Tapir, which is thus deſcribed by M. Bajon.

The figure of the tapir bears ſome general reſemblance to that of a hog; but he is of the height of a ſmall mule, having an extremely thick body and ſhort legs. He is covered with hair of a longer kind than the horſe or aſs; but not ſo long nor thick as that of a hog. His mane, which is ſtraight, is but little longer than the reſt of the hair, and reaches from the top of the head to the ſhoulders; the head is large and long, the eyes very ſmall and black: the ears black, and ſomewhat like thoſe of a hog. He is provided with a trunk on the upper lip of nearly a foot long, the movements of which are extremely ſupple, and in which reſides the organ of ſmell, as in the elephant, and which he extends in order to graſp fruits, &c. The two noſtrils are at the end of the trunk. The tail is only two inches long, and is nearly naked. The hair of the body is of a ſomewhat deep brown; the limbs ſhort and thick; the feet very large, and rather rounded; the fore feet have four toes, and the hind three: all the toes are covered with a hard thick hoof or horn. Though the head is very large, it contains but a very ſmall brain; the jaws are much elongated, and furniſhed, in general, with 40 teeth; but ſometimes there are more, and ſometimes fewer. The cutting teeth are ſharp-edged, and are the teeth which vary as to number. After the cutting teeth, we find a canine tooth on each ſide, both above and below, which have a good deal of reſemblance to thoſe of a boar; we then find a ſmall ſpace or interval without teeth, and then follow the grinders, which are very large, with very broad ſurfaces. Belluæ.

M. Bajon imagined, that, on diſſection, he diſcovered three ſtomachs within this animal, and therefore he conſidered it to be a ruminating animal; but this was afterwards found to be a miſtake. It appeared, on diſſecting a tapir brought alive to Paris, that the ſtomach was very large, and was contracted in two places, but was ſtill a ſingle uniform ſtomach.

The female tapir is larger than the male, and has a weaker voice.

The tapir was once conſidered as an amphibious animal; but this opinion ſeems to be erroneous.

For an anatomical account of the ſkeleton of the tapir, by Cuvier, ſee *Annales de Muſ. Nat.* tom. iii. p. 132.

Genus 48. SUS. *HOG.*

Front teeth in the upper jaw four, converging. In the lower jaw ſix, projecting. Canine teeth or tuſks, in the upper jaw two, long, exſerted. Snout truncated, prominent, moveable. Feet cloven. 160 Sus.

In their manners the whole of this tribe nearly reſemble each other, being in general filthy and diſguſting, and very fond of wallowing in the mire. They feed indifferently on animal and vegetable food, but ſeem to prefer the latter when they can obtain it. They are particularly fond of acorns, beech maſt, and ſimilar fruits, and with their ſtrong tendinous ſnout they dig up the earth in ſearch of roots. They are exceedingly prolific.

There are about five ſpecies, viz.

1. * *S. Scrofa*, Common H. Body briſtled in front; tail hairy.—2. *S. Ethiopicus*, Ethiopian H. Wattles beneath the eyes.—3. *S. Africanus*, Cape Verd H. Only two front teeth.—4. *S. Babyruſſa*, Babyrouſſa, or Horned H. The two upper tuſks growing from the upper part of the front.—5. *S. Tajaſſu*, Pacary. Tailleſs, with a glandular orifice on the back.

1. *S. Scrofa*, Common H.—The common hog is found either in a wild or domeſtic ſtate, in almoſt all the temperate parts of Europe and Aſia; but it is not met with in the moſt northern parts of theſe continents. It is alſo found in the upper parts of Africa. Dr Shaw remarks, that it is not indigenous to the Britiſh iſles; but Mr Pennant aſſerts, that the wild boar was formerly a native of this country, as appears from the laws of Hoel dda, who permitted his grand huntſman to chaſe that animal from the middle of November to the beginning of December. William the Conqueror puniſhed, with the loſs of their eyes, any that were convicted of killing 161 Scrofa. Common Hog. Fig. 79.

killing the wild boar, the ſtag, or the roe-buck; and Fitz-Stephens tells us, that the vaſt foreſt that in his time grew on the north ſide of London, was the retreat of ſtags, fallow-deer, wild boars, and bulls.

The wild boar inhabits woods, living on various kinds of vegetables, viz. roots, maſt, acorns, &c. &c. It alſo occaſionally devours animal food. It is, in general, conſiderably ſmaller than the domeſtic hog, and is of a dark brindled gray colour, ſometimes blackiſh; but, when only a year or two old, is of a pale red or dull yellowiſh brown caſt; and, when quite young, is marked by alternate duſky and pale ſtripes diſpoſed longitudinally on each ſide the body. Between the briſtles, next the ſkin, is a finer or ſofter hair, of a woolly or curling nature. The ſnout is ſomewhat longer in proportion than that of the domeſtic animal; but the principal difference is in the ſuperior length and ſize of the tuſks, which are often ſeveral inches long, and capable of inflicting the moſt ſevere and fatal wounds.

The hunting of the wild boar forms one of the amuſements of the great in ſome parts of Germany, Poland, &c. and is a chaſe of ſome difficulty and danger, not on account of the ſwiftneſs, but the ferocity of the animal.

Wild boars, ſays Buffon, which have not paſſed their third year, are called by the hunters *beaſts of company*, becauſe previous to this age they do not ſeparate, but follow their common parent. They never wander alone till they have acquired ſufficient ſtrength to reſiſt the attacks of the wolf. Theſe animals, when they have young, form a kind of flocks; and it is upon this alone that their ſafety depends. When attacked, the largeſt and ſtrongeſt front the enemy, and by preſſing all round againſt the weaker, force them into the centre. Domeſtic hogs are alſo obſerved to defend themſelves in a ſimilar manner. The wild boar is hunted with dogs, or killed by ſurpriſe, during the night, when the moon ſhines. As he flies ſlowly, leaves a ſtrong odour behind him, and defends himſelf againſt the dogs, and often wounds them dangerouſly, fine hunting dogs are unneceſſary, and would have their noſe ſpoiled, and acquire a habit of moving ſlowly by hunting him. Maſtiffs, with very little training, are ſufficient. The oldeſt boars, which are known by the track of their feet, ſhould alone be hunted; a young boar of three years old is difficult to be attacked, becauſe he runs very far without ſtopping; but the old boars do not run far, allow the dogs to come near, and often ſtop to repel them. During the day the boar commonly keeps in his ſoil, which is in the moſt ſequeſtered parts of the woods, and comes out by night in queſt of food; and in ſummer, when the grain is ripe, it is eaſy to ſurpriſe him among the cultivated fields, which he frequents every night.

As the wild boar advances in age, after the period of three or four years, he becomes leſs dangerous, on account of the growth of his tuſks, which turn up, or make ſo large a curve, as often rather to impede than aſſiſt his intentions of wounding with them.

According to the French newſpapers for the year 1787, a wild boar, of moſt extraordinary ſize, was killed in the neighbourhood of Cognac in Angumois, which had often eſcaped from the hunters, had received many gun-ſhot wounds, and had coſt the lives of ſeveral dogs and men each time of attacking him. When this animal was at length killed, [illegible] were ſaid to have been found between his ſkin and fleſh. M. Sonnini, who details this anecdote from the public papers, obſerves, that if the relation had not been given by hunters of diſtinguiſhed order, and too well acquainted with theſe animals to have made any miſtake, we might imagine that this formidable creature, which had long committed its ravages in the park of Cognac, belonged to a totally different ſpecies. It was of enormous ſize, with a very long head, a very ſharp or pointed ſnout; and its mouth was armed with teeth of a very ſingular form. The hairs of the body were white, thoſe of the head yellowiſh, the neck marked with a black band in form of a cravat, and the ears large and ſtraight; and what appears ſurpriſing, conſidering its ſize, it was of uncommon ſwiftneſs.

In a domeſtic ſtate the ſow brings forth twice a year, and produces from 10 to 20 at a litter. She goes rather more than four months with young. At the time of bringing forth ſhe muſt be carefully watched, as ſhe ſometimes devours her young, and it is ſtill more neceſſary to keep off the boar, who may deſtroy the whole litter.

There are ſeveral varieties of the hog bred in this country; but thoſe in greateſt requeſt are generally known by the name of *Berkſhire pigs*. Theſe are uſually of a reddiſh-brown colour, with black ſpots; they have large ears hanging over their eyes, are ſhort-legged, ſmall-boned, and very eaſily fattened. Mr Culley mentions one of theſe that was killed at Congleton in Cheſhire, which meaſured from the noſe to the end of the tail nine feet eight inches, was four feet and a half high, and weighed, when killed, 86 ſtones 11lbs. avoirdupois.

The Chineſe, or black breed, are now very common in England. They are ſmaller, have ſhorter legs, and their fleſh is whiter and ſweeter than the common kind. Of this ſort were thoſe found in New Guinea, which proved ſo ſeaſonable a relief to our circumnavigators, when that country was firſt viſited by them. There are likewiſe great numbers of them in the Friendly and Society iſlands, the Marqueſas, and many other of the lately diſcovered iſlands in the South ſeas. Theſe are fed with plantains, bread-fruit, and yams; and are exceedingly fat. They are frequently ſeen by the natives in their canoes, ſwimming from one iſland to another, and killed by them with lances and arrows.

The hog ſpecies, though very numerous and diffuſed over Europe, Aſia, and Africa, did not exiſt in America, till tranſported thither by the Spaniards. In many places they have multiplied exceedingly, and become wild. They reſemble the domeſtic hog, but their bodies are ſhorter, and their ſnout and ſkin thicker.

This animal has been compared to a miſer, who is uſeleſs and rapacious in his life; but on his death becomes of public uſe, by the very effects of his ſordid manners. The hog, during life, does not render the leaſt ſervice to mankind, except in removing that filth which other animals reject. His more than common brutality urges him to devour even his own offspring. All other domeſtic quadrupeds ſhew ſome degree of reſpect to mankind, and even a ſort of tenderneſs for us in our helpleſs years; but this animal will devour infants, whenever it has opportunity.

The parts of this animal are finely [illegible] of life. As its method of feeding [illegible]

[illegible] earth for roots of different kinds, ſo nature has given it a more prone form than other animals; a ſtrong brawny neck, eyes ſmall, and placed high in the head, a long ſnout, noſe callous and tough, and a quick ſenſe of ſmelling to trace out its food. Its inteſtines have a ſtrong reſemblance to thoſe of the human ſpecies; a circumſtance that ſhould mortify our pride. The external form of its body is very unwieldy, yet, by the ſtrength of its tendons, the wild boar is enabled to fly from the hunters with amazing agility. The back toe on the feet of this animal prevents it from ſlipping while it deſcends declivities, and muſt be of ſingular uſe when purſued; yet, notwithſtanding its powers of motion, it is by nature torpid, inactive, and drowſy; much inclined to increaſe in fat, which is diſpoſed in a different manner from other animals, and forms a regular coat over the whole body. It is reſtleſs at a change of weather, and in certain high winds is ſo agitated as to run violently, ſcreaming horribly at the ſame time: it is fond of wallowing in the dirt, either to cool its ſurfeited body, or to deſtroy the lice, ticks, and other inſects with which it is infeſted. Its diſeaſes generally ariſe from intemperance: meaſles, impoſthumes, and ſcrophulous complaints, are reckoned among them.

Linnæus obſerves that its fleſh is a wholeſome food for athletic conſtitutions, or thoſe that uſe much exerciſe, but bad for ſuch as lead a ſedentary life. It is of moſt univerſal uſe, and furniſhes numberleſs materials for epicuriſm, among which brawn is a kind peculiar to England. The fleſh of the hog is an article of the firſt importance to a naval and commercial nation, for it takes ſalt better than any other kind, and conſequently is capable of being preſerved longer. The lard is of great uſe in medicine, being an ingredient in ſeveral ſorts of plaſters, either pure, or in the form of pomatum; and the briſtles are formed into bruſhes of ſeveral kinds.

182 Babyruſſa. Fig. 82.

4. *S. Babyruſſa*, the Babyrouſſa.—This animal nearly reſembles the common hog in ſize; but his body is rather longer, his limbs more ſlender, and, inſtead of briſtles, he is covered with fine ſhort, rather woolly hair, of a deep brown or blackiſh colour, with only a few briſtles on the upper and hinder parts of the back. It is principally diſtinguiſhed from other ſpecies by the very extraordinary poſition and form of the upper tuſks. Theſe, inſtead of being ſituated internally on the edge of the jaw, as in other animals, are placed without, through the ſkin of the ſnout, turning upwards towards the forehead. As the animal advances in age, thoſe tuſks become ſo extremely long and curved, as to touch the forehead, and then bend downwards, when they muſt loſe their power as offenſive weapons, for which they were probably intended in the younger animal. Theſe upper tuſks are of a fine hard grain, and may be uſed as ivory. The tuſks of the lower jaw reſemble thoſe of the other ſpecies, and are very long, ſharp, and curved; but not nearly ſo large as thoſe of the upper jaw. The eyes are ſmall; the ears erect and pointed; the tail pretty long, ſlender, and terminated by a tuft of long hairs.

This ſpecies is gregarious, and found in large herds in ſeveral parts of Java, Amboyna, and other Indian iſlands. It feeds entirely on vegetables, and often eats the leaves of trees. When ſleeping or reſting itſelf in a ſtanding poſture, it is ſaid to hook its tuſks acroſs the lower branches of the trees by way of ſupport. When purſued, theſe animals will often plunge into a river, or even into the ſea, and they can ſwim with great eaſe, and to a vaſt diſtance. Their voice is ſaid to reſemble that of the common hog; but it is ſometimes a ſtrong, loud, growling note. It is occaſionally domeſticated by the natives of the Indian iſlands, and its fleſh is conſidered as wholeſome food.

This order contains four genera and 13 ſpecies.

In the claſs Mammalia, we have enumerated or deſcribed about 537 ſpecies; of which the following table ſhews the number in each genus.

Simia contains	62 ſpecies
Lemur,	13
Galeopithecus,	1
Vespertilio,	24
Bradypus,	3
Myrmecophaga, about	6
Manis,	3
Dasypus about	6
Rhinoceros, perhaps	3
Elephas,	1
Platypus,	1
Trichecus, about	7
Phoca,	19
Canis, about	23
Felis, about	25
Viverra, about	48
Lutra,	8
Ursus, about	9
Didelphis, about	18
Dasyurus,	6
Perameles,	2
Wombat,	1
Macropus,	2
Talpa,	7
Sorex,	16
Erinaceus,	5
Hystrix,	6
Cavia,	7
Castor,	2
Mus, about	44
Hydromys,	3
Arctomys,	8
Sciurus,	26
Myoxus,	7
Dipus,	6
Lepus,	12
Hyrax,	3
Camelus,	7
Moschus,	7
Cervus,	12
Camelopardalis,	1
Antilope,	32
Capra,	8
Ovis,	8
Bos,	6
Equus,	6
Hippopotamus,	1
Tapir,	1
Sus,	5
Total	537

Of theſe about 36 are found in Britain.

The

xplana- n of the Plates. The compiler of this article is conſcious that it labours under many deficiencies; that many animals, which ought to have been deſcribed, are merely enumerated; and that the accounts of ſeveral, which are uſually conſidered as important objects of natural hiſtory, are much leſs complete than might have been expected. For many of theſe defects he does not hold himſelf accountable. From the very limited ſpace within which he was obliged to confine the article, it was neceſſary, either that he ſhould treat of every ſpecies in a very conciſe manner, ſo as to make the treatiſe merely a tabular ſketch, or that he ſhould content himſelf with a ſyſtematic arrangement of all the mammalia at preſent known, and enlarge only on a few of the more important ſpecies. He has choſen the latter alternative, which, by making the article more intereſting to the generality of readers, ſeems beſt adapted to the nature of this work; while the ſyſtematic arrangement, with the ſpecific characters, will aſſiſt the naturaliſt who knows where to refer for a particular account of the individuals.

EXPLANATION OF THE PLATES.

Plate CCCI.

Fig. 1. *Simia Satyrus*, Oran Otan.

Fig. 2. *Simia Inuus*, Magot or Barbary Ape.

Fig. 3. *Simia Sylvanus*, Pygmy.

Fig. 4. *Simia Sphinx*, Great Baboon.

Fig. 5. *Simia Beelzebul*, Alouatte or Preacher Monkey.

Fig. 6. *Simia Argentata*, Mico or Fair Monkey.

Plate CCCII.

Fig. 7. *Lemur Tardigradus*, Slow Lemur.

Fig. 8. *Galeopithecus Volans*, Flying Calugo.

Fig. 9. *Veſpertilio Auritus*, Long-eared Bat.

Fig. 10. *Veſpertilio Vampyrus*, Vampyre Bat.

Fig. 11. *Bradypus Tridactylus*, Three-toed Sloth.

Fig. 12. *Myrmecophaga Jubata*, Great Ant-Eater.

Plate CCCIII.

Fig. 13 *Manis Pentadactyla*, Pangolin, or Short-tailed Manis.

Fig. 14. *Manis Tetradactyla*, Long-tailed Manis.

Fig. 15. *Daſypus Sexcinctus*, Six-banded Armadillo.

Fig. 16. *Rhinoceros Unicornis*, Single-horned Rhinoceros.

Plate CCCIV.

Fig. 17. *Elephas Maximus*, Elephant.

Fig. 18. *Sukotyro.*

Fig. 19. *Platypus Anatinus*, Duck-billed Platypus.

Fig. 20. *Trichecus Roſmarus*, Arctic Walrus.

Plate CCCV.

Fig. 21. *Phoca Vitulina*, Common Seal, or Sea-calf.

Fig. 22. *Canis Domeſticus*, Common Dog.
Var. Shepherd's Dog.

Fig. 23. Maſtiff.

Fig. 24. Foxhound.

Fig. 25. Terrier.

Fig. 26. Greyhound.

Fig. 27. Iriſh Greyhound.

Plate CCCVI.

Fig. 28. *Canis Lupus*, Wolf.

Fig. 29. *Canis Hyæna*, Hyæna.

Fig. 30. *Canis Aureus*, Jackal.

Fig. 31. *Canis Zerda*, Fennec.

Fig. 32. *Felis Leo*, Lion.

Fig. 33. *Felis Tigris*, Tiger.

Plate CCCVII.

Fig. 34. *Felis Catus*, Wild Cat.

Fig. 35. *Viverra Ichneumon*, Ichneumon.

Fig. 36. *Viverra Civetta*, Civet Cat.

Fig. 37. *Viverra Foina*, Martin.

Fig. 38. *Viverra Furo*, Ferret.

Fig. 39. *Lutra Vulgaris*, Common Otter.

Plate CCCVIII.

Fig. 40. *Urſus Arctos*, Brown Bear.

Fig. 41. *Urſus Maritimus*, White or Polar Bear.

Fig. 42. *Urſus Meles*, Badger.

Fig. 43. *Didelphis Virginiana*, Virginian Opoſſum.

Fig. 44. *Didelphis Dorſigera*, Merian Opoſſum.

Fig. 45. *Daſyurus Viverrinus*, Viverrine Daſyurus.

Plate CCCIX.

Fig. 46. The *Wombat.*

Fig. 47. *Macropus Major*, Kanguroo.

Fig. 48. *Talpa Radiata*, Radiated Mole.

Fig. 49. *Sorex Araneus*, Common Shrew.

Fig. 50. *Erinaceus Europæus*, Common Hedgehog.

Fig. 51. *Hystrix Criſtata*, Porcupine.

Fig. 52. *Caſtor Fiber*, Common Beaver.

Plate CCCX.

Fig. 53. *Cavia Cobaya*, Reſtleſs Cavy, or Guinea-Pig.

Fig. 54. *Mus Cricetus*, Hamſter Rat.

Fig. 55. *Hydromys Coypus*, Coypou Rat.

Fig. 56. *Arctomys Marmota*, Alpine Marmot.

Fig. 57. *Sciurus Vulgaris*, Common Squirrel.

Fig. 58. *Myoxus Muſcardinus*, Common Dormouſe.

Fig. 59. *Dipus Jaculus*, Common Jerboa.

Plate CCCXI.

Fig. 60. *Lepus Timidus*, Hare ſitting.

Fig. 61. *Hyrax Syriacus*, Syrian Hyrax.

Fig. 62. *Camelus Dromedarius*, Arabian Camel or Dromedary.

Fig. 63. *Moſchus Moſchiferus*, Tibetian Muſk.

Fig. 64. *Cervus Alces*, Elk.

Fig. 65. *Camelopardalis Giraffa*, Camelopardalis or Giraffe.

Plate CCCXII.

Fig. 66. *Antilope Picta*, Nyl-ghau.
Fig. 67. *Capra Ibex*, Ibex.
Fig. 68. *Ovis Argali*, Argali or Wild Sheep.
Fig. 69. *Ovis Aries*, var. Wallachian Ram.
Fig. 70. *Bos Taurus*, var. European Biſon.
Fig. 71. *Bos Grunniens*, Yak of Tartary.

Plate CCCXIII.

Fig. 72. *Equus Caballus*, Horſe.
Fig. 73. *Equus Aſinus*, Wild Aſs.
Fig. 74. *Mule.*

Plate CCCXIV.

Fig. 75. *Equus Zebra*, Zebra.
Fig. 76. *Equus Quagga*, Quagga.
Fig. 77. *Hippopotamus Amphibius*, Hippopotamus, or River Horſe.
Fig. 78. *Tapir Americanus*, Tapir.
Fig. 79. *Sus Scrofa*, Wild Boar.
Fig. 80. *Sus Babyruſſa*, Babyrouſſa.

ERRATUM.—N° 139. ſpecies 3. in ſome copies, for *C. Elephas* read *C. Elaphus*.

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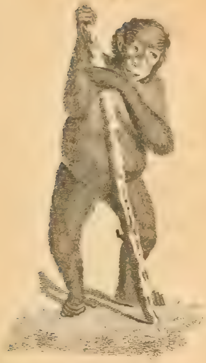
Fig. 1



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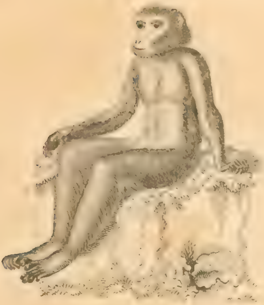

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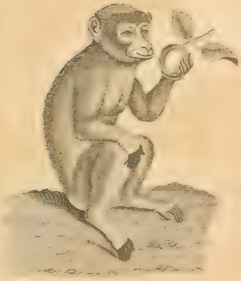

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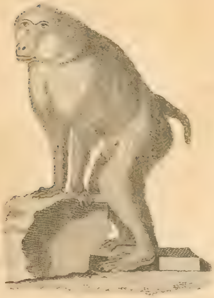

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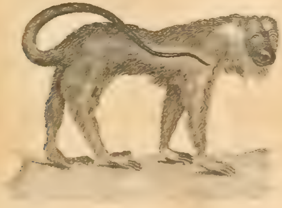

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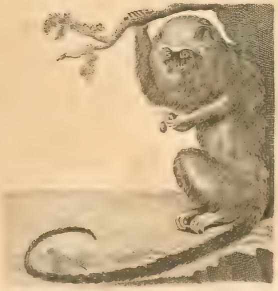
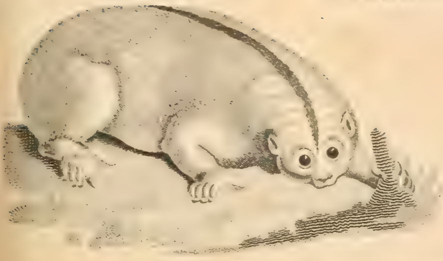


A. Bell Prin. Pal. Sculptor fecit

Fig. 7.



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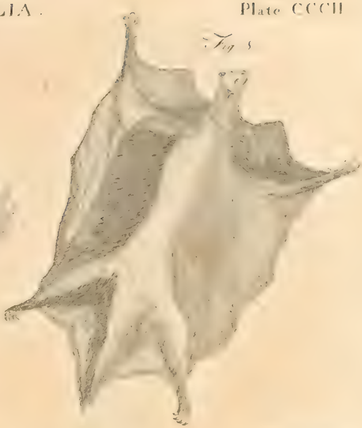

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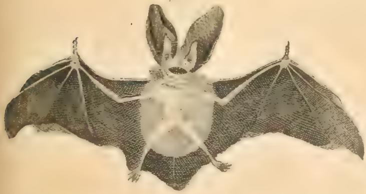


Fig. 10

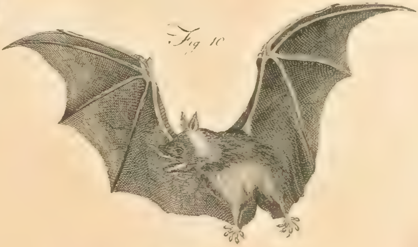
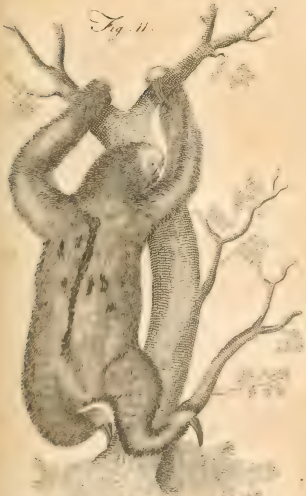


Fig. 11.



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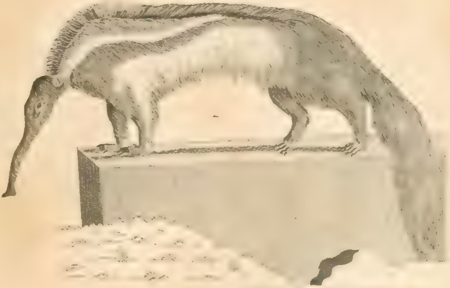

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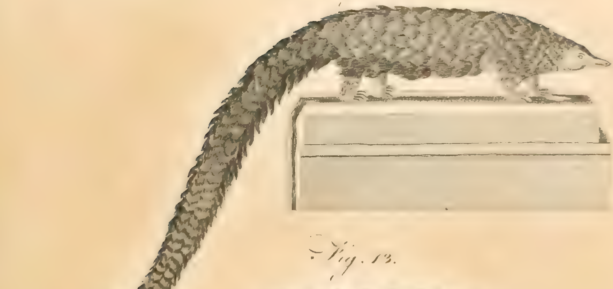

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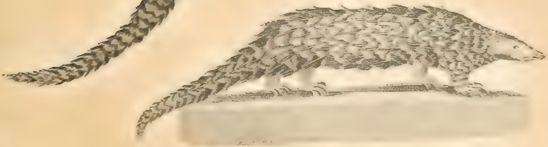

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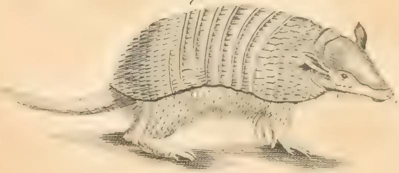

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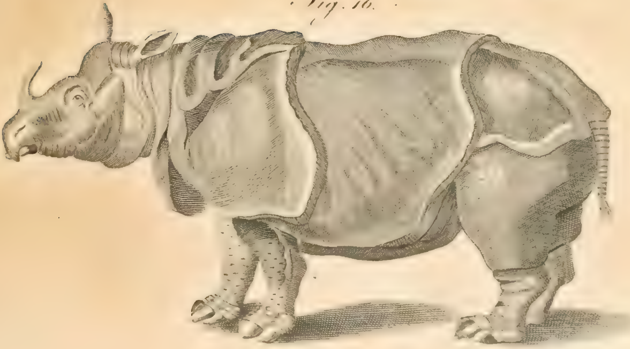

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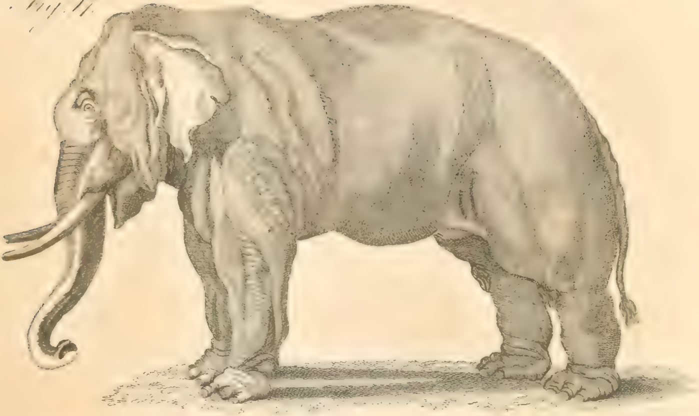

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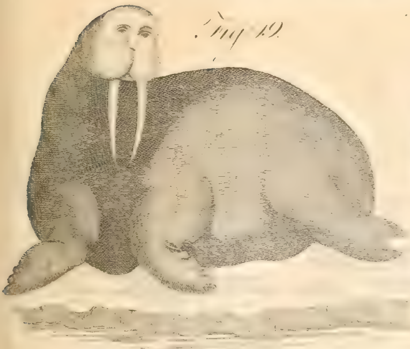

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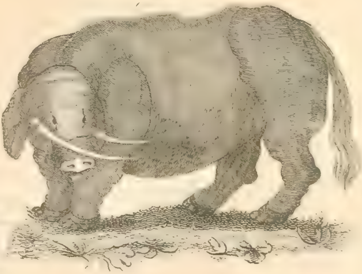

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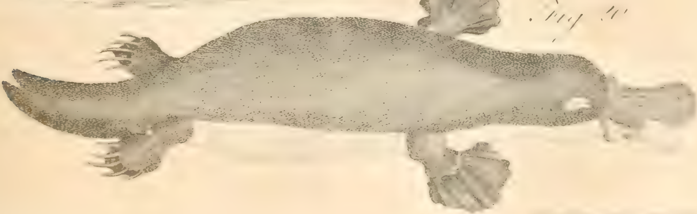

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MAMMEA, *Mammee-Tree*; a genus of plants belonging to the polyandria claſs; and in the natural method ranking with thoſe of which the order is doubtful. See Botany *Index*.

MAMMON, the god of riches, according to ſome authors; though others deny that the word ſtands for ſuch a deity, and underſtand by it only *riches* themſelves. Our Saviour ſays, We *cannot ſerve God and Mammon*; that is, be religious and worldly minded at the ſame time. Our poet Milton, by poetic licenſe, makes Mammon to be one of the fallen angels, and gives us his character in the following lines:

> Mammon, the leaſt erected ſpirit that fell
> From heav'n; for ev'n in heav'n his looks and thoughts
> Were always downward bent; admiring more
> The riches of heav'n's pavement, trodden gold,
> Than ought divine or holy elſe enjoy'd
> In beatific viſion: by him firſt
> Man alſo, and by his ſuggeſtion taught,
> Ranſack'd the centre, and with impious hands
> Rifled the bowels of their mother earth,
> For treaſures better hid. Soon had his crew
> Open'd into the hill a ſpacious wound,
> And digg'd out ribs of gold. Let none admire
> That riches grow in hell; that ſoil may beſt
> Deſerve the precious bane.

MAMMOTH, or Mammuth, the name of a huge animal, now unknown, to which are ſaid to have belonged thoſe tuſks, bones, and ſkeletons, of vaſt magnitude, which have been frequently found in different parts of Siberia, as well in the mountains as the valleys; likewiſe in Ruſſia, Germany, and North America. Many ſkeletons of them may be ſeen in the Imperial cabinet at Peterſburgh: in the Britiſh, Dr Hunter's, and the late Sir-Aſhton Lever's muſeums, and in that of the Royal Society. A deſcription of the mammoth is given by Muller in the *Recueil des Voyages au Nord*: "This animal, he ſays, is four or five yards high, and about 30 feet long. His colour is grayiſh. His head is very long, and his front very broad. On each ſide, preciſely under the eyes, there are two horns, which he can move and croſs at pleaſure. In walking he has the power of extending and contracting his body to a great degree." Iſbrandes Ides gives a ſimilar account; but he is candid enough to acknowledge, that he never knew any perſon who had ſeen the mammoth alive. Mr Pennant, however, thinks it "more than probable that it ſtill exiſts in ſome of thoſe remote parts of the vaſt new continent, impenetrated yet by Europeans. Providence (he adds) maintains and continues every created ſpecies; and we have as much aſſurance, that no race of animals will any more ceaſe while the earth remaineth, than *ſeed-time and harveſt*, *cold and heat*, *ſummer and winter*, *day and night*." The Ohio Indians have a tradition handed down from their fathers reſpecting theſe animals, "That in ancient times a herd of them came to the Big-bone Licks, and began an univerſal deſtruction of the bears, deer, elks, buffaloes, and other animals which had been created for the uſe of the Indians: that the Great Man above, looking down and ſeeing this, was ſo enraged that he ſeized his lightning, deſcended to the earth, ſeated himſelf upon a neighbouring mountain on a rock, on which his ſeat and the print of his feet are ſtill to be ſeen, and hurled his bolts among them till the whole were ſlaughtered, except the big bull, who, preſenting his forehead to the ſhafts, ſhook them off as they fell; but at length miſſing one, it wounded him in the ſide; whereon, ſpringing round, he bounded over the Ohio, the Wabaſh, the Illinois, and finally over the great lakes, where he is living at this day." See Mammalia *Index*.

MAMRE, an Amorite, brother of Aner and Eſhcol, and friend of Abraham (Gen. xiv. 13.). It was with theſe three perſons, together with his own and their domeſtics, that Abraham purſued and overcame the kings after their conqueſt of Sodom and Gomorrah. This Mamre, who dwelt near Hebron, communicated his name to great part of the country round about. Hence we read (chap. xiii. 18. xxiii. 17, &c.), that Abraham dwelt in Mamre and in the plain of Mamre. But it is obſerved, that what we tranſlate the *plain* ſhould be rendered the *oak*, of Mamre, becauſe the word *elon* ſignifies an *oak* or *tree of a long duration*. Sozomen tells us, that this tree was ſtill extant, and famous for pilgrimages and annual feaſts, even in Conſtantine's time; that it was about ſix miles diſtant from Hebron; that ſome of the cottages which Abraham built were ſtill ſtanding near it; and that there was a well likewiſe of his digging, whereunto both Jews, Chriſtians, and Heathens, did at certain ſeaſons reſort, either out of devotion or for trade, becauſe there was held a great mart. To theſe ſuperſtitions Conſtantine the Great put a ſtop.

1 Importance of the ſtudy of man. MAN. Of all the objects which the univerſe preſents to our obſervation, there is none that ſo powerfully calls for our attention, there is none with which it ſo much concerns us to be intimately acquainted, as the human ſpecies. If we admit, what mankind, in that pride of heart, which is ſo natural to thoſe who ſtyle themſelves the *lords of the creation*, have aſſumed, that man is the only being poſſeſſed of reaſon; there is no *created thing* that can in the leaſt ſtand in competition with him. But, without examining into the validity of this excluſive claim, without inquiring whether ſome of our inferior *fellow mortals* may not be admitted to ſome ſmall ſhare of this faculty; it muſt be allowed that, whether we conſider him as a ſolitary being, poſſeſſed of beauty and intelligence ſuperior to the other claſſes of animated nature, or in the more amiable character of a ſocial being, capable of the ſentiments of affection, friendſhip, gratitude, and benevolence, man is a moſt diſtinguiſhed perſonage; and, to his fellow men, certainly the moſt intereſting object to which they can direct their attention; that in ſhort,

> "The proper ſtudy of mankind is man."

A full examination of every thing relating to the human ſpecies would include almoſt all that is intereſting, uſeful, or curious in nature. Indeed this whole work is little more than a collection of facts and reaſonings, that either mediately or immediately relate to MAN. It may not be improper here to refer to a few of the principal articles alluded to, before we enter on the proper buſineſs of this article, which is to ſtate a few general circumſtances relating to the *natural hiſtory* of man, conſidering him as the *firſt animal* in the creation.

2 Outline of the ſtudy of man. *Firſt*, Man may be conſidered *generically*; as conſtituting a *tribe* of animals differing from all others, in his *ſtructure*, *functions*, *diſeaſes*, and in poſſeſſing the *faculty of reaſon*.

The *ſtructure* of man has been detailed under ANATOMY; his *functions* will be treated of under PHYSIOLOGY; the *diſeaſes* and *accidents* to which he is expoſed, with their treatment and remedies, will form the ſubjects of MEDICINE, MIDWIFERY, SURGERY, and MATERIA MEDICA; and the nature and exerciſe of his *reaſoning powers* are diſcuſſed under LOGIC, METAPHYSICS, LANGUAGE, GRAMMAR, ORATORY, ARITHMETIC, ALGEBRA, GEOMETRY, &c.

Secondly, Man may be conſidered *ſpecifically*, as differing from others of the ſame tribe in *height*, *features*, *colour*, *diſpoſition*, and *manners*; reſulting from climate and other local circumſtances. In a general point of view, the varieties of the human ſpecies fall to be noticed *here*; but, for a particular account of the inhabitants of different regions of the globe, we refer the reader to the geographical articles AFRICA, ASIA, AMERICA, ABYSSINIA, CEYLON, HINDOSTAN, *New* HOLLAND, &c.

Thirdly, Man may be conſidered as a *dependent* and an *accountable being*, in relation to his *Creator*, his *neighbour*, or *himſelf*. The *religious* and *moral duties* of man are explained under THEOLOGY, CHRISTIANITY, MORAL PHILOSOPHY, and LAW; and to theſe may be added, as connected with man in this third view, *Political Economy*, AGRICULTURE, GARDENING, ARCHITECTURE, CHEMISTRY, DIETETICS, MECHANICS, HYDRODYNAMICS, and a variety of other branches of ſcience, that teach man how to employ to the beſt advantage thoſe powers and faculties with which Heaven has endowed him, for his individual and common benefit.

Laſtly, We may conſider man with reſpect to the relations that ſubſiſt between him and the inferior claſſes of the creation, as they miniſter to his neceſſities, ſupply his wants, abridge his comforts, or oppoſe his progreſs. This conſideration naturally leads us to the article NATURAL HISTORY, and its ſubdiviſions MAMMALIA, CETOLOGY, ENTOMOLOGY, OPHIOLOGY, ORNITHOLOGY, ICHTHYOLOGY, HELMINTHOLOGY, CONCHOLOGY, BOTANY, MINERALOGY, GEOLOGY, and METEOROLOGY.

3 Writers on man. Of thoſe writers who directly treat of man, the *philoſopher* and the *moraliſt* conſider him in the abſtract; the *geographer* deſcribes him as he exiſts in communities; the *hiſtorian* traces the origin of ſociety, the progreſs of man in arts, civilization, and refinement, and the changes that have taken place among the human ſpecies, from the natural operation of phyſical cauſes, or from the folly, villainy, and ambition of princes and heroes; the *biographer* treats of man as an individual, and ſhews the effects of exalted virtue, eminent abilities, or ſtriking vices, both on their poſſeſſor and on the community at large. It is the buſineſs of the *naturaliſt* to deſcribe the external form of man, as it differs from that of other animals; to conſider the uſual varieties of it in different nations, and the more ſtriking peculiarities that are occaſionally found in individuals; to deſcribe the habits and manners of the human ſpecies; the progreſs of life from infancy to death; the duration of life and its cauſes; and the effects produced on the body by death.

Of the writers who have treated on ſome part of the natural hiſtory of man, we might give a moſt copious liſt, even without including the almoſt innumerable catalogue of medical works. For the generality of readers, it may be ſufficient to refer to Buffon's Natural Hiſtory, or the Abridgement of it by Goldſmith; to Virey's *Hiſtoire Naturelle du Genre Humain*; Cuvier's *Tableau Elementaire de l'Hiſtoire Naturelle des Animaux*; Herder's Outlines of the Philoſophy of the Hiſtory of Man; and the works of Daubenton, Vicq d'Azyr, Camper, Blumenbach, &c. &c.

We had propoſed giving here a ſhort popular view of the *ſtructure* and *economy* of man; but as even this would lead us into details for which we cannot afford room, we muſt refer our readers to Kerr's Tranſlation of the Syſtem of Linnæus, and Dr Hunter's Introductory Lectures to his courſe of Anatomy.

It is of more conſequence to our preſent purpoſe to mention the particular circumſtances that diſtinguiſh man from thoſe animals to which he ſeems neareſt allied. Theſe diſtinctive marks are well deſcribed by Blumenbach, in his work *De Generis Humani Varietate Nativa*, and by M Daubenton, in his introduction to the Dictionary of Natural Hiſtory in the *Encyclopédie Méthodique*; with the latter we ſhall preſent our readers.

4 The only animals that bear any ſtriking reſemblance to man, in point of ſtructure, are the apes, eſpecially the orang otang, and the gibbon; but according to M.

Man.

Besides these, there are two principal circumstances that particularly distinguish man from these animals; the calf in the leg, formed by the muscles of the legs, by which the body is supported in a vertical position above them; [illegible] of the head with the neck, by means of its base.

We stand upright, bend our body, and walk, without thinking of the power by which we are supported in these different positions. This power resides chiefly in the muscles which constitute the principal part of the calf of the leg. Their exertion is felt, and their motion visible externally, when we stand upright and bend our body forwards and backwards. This power [illegible] when we walk even on a horizontal plane. [illegible] of the body [illegible]. All their motions are natural to man. Other animals, on the contrary, when placed on their hind legs, are either incapable of supporting themselves at all, or do it partially, with great difficulty, and for a very short time. The gibbon, and the oran otan, can stand upright with much less difficulty than other brutes; but the restlessness they show under this attitude, plainly shows that it is not natural to them. The reason is, that the muscles in the back part of the leg in the *gibbon*, &c. are not, as in man, sufficiently large to form a calf, and consequently not sufficiently ſtrong to ſupport the thighs and body in a vertical line, and to preserve them in that poſture. See MAMMALIA, n° 28.

M. Daubenton has diſcovered, that the attitudes proper to man and to other animals, are pointed out by the different ways in which the head is articulated with the neck. The two points by which the oſſeous part of the head is connected with the firſt joint of the neck, and on which every movement of the head is made with the greateſt facility, are placed at the edge of the great hole of the occipital bone, which in man is ſituated near the centre of the baſe of the ſkull, (affording a paſſage for the medullary ſubſtance into the vertebral canal,) as upon a pivot or point of ſupport. The face is on a vertical line, almoſt parallel to that of the body and neck. The jaws, which are very ſhort when compared with thoſe of moſt other animals, extend very little farther forwards than the forehead. No animal has, like man, its hind legs as long as the body, neck, and head, taken together, meaſuring from the top of the head to the os pubis.

5 Differences between man and quadrupeds distinguished.

In the frame of the human body the principal parts are nearly the ſame with thoſe of other animals; but in the connexion and form of the bones there is as great a difference as in the attitudes proper to each. Were a man to aſſume the natural poſture of quadrupeds, and try to walk by the help of his hands and feet, he would find himſelf in a very unnatural ſituation; he could not move his feet and hands but with the greateſt difficulty and pain; and let him make what exertions he pleaſed, he would find it impoſſible to attain a ſteady and continued pace. The principal obſtacles he would meet with would ariſe from the ſtructure of the pelvis, the hands, the feet, and the head.

The plane of the great occipital hole, which in man is nearly horizontal, puts the head in a kind of equilibrium upon the neck when we ſtand erect in our natural attitude; but when we are in the attitude of quadrupeds, it prevents us from raiſing our head ſo as to look forwards, becauſe the movement of the head is ſtopt by the protuberance of the occiput, which then approaches too near the vertebræ of the neck.

In moſt animals, the great hole of the occipital bone is ſituated at the back part of the head; the jaws are very long; the occiput has no protuberance beyond the aperture, the plane of which is in a vertical direction, or inclined a little forwards or backwards; ſo that the head is ſuſpended, and joined to the neck by its poſterior part. This poſition of the head enables quadrupeds, though their bodies are in a horizontal direction, to preſent their muzzle forwards, and to raiſe it ſo as to reach above them, or to touch the earth with the extremity of their jaws when they bring their neck and head down to their feet. In the attitude of quadrupeds, man could touch the earth only with the fore part or the top of the head.

6 Man could never be a quadruped.

To theſe differences of ſtructure, we may add, that when man is ſtanding, his heel reſts upon the earth as well as the other parts of his foot; when he walks it is the hind part that touches the ground; man can ſtand on one foot; theſe are peculiarities in ſtructure and in the manner of moving which are not to be found in other animals. We may therefore conclude that man cannot be ranked in the claſs of quadrupeds. We may add, that in man the brain is much larger, and the jaws much ſhorter, than in any other animal. The brain, by its great extent, forms the protuberance of the occipital bone, the fore head, and all that part of the head which is above the ears. In the inferior animals, the brain is ſo ſmall, that moſt of them have no occiput, and the front is either wanting or little raiſed. In animals which have large foreheads, ſuch as the horſe, the ox, the elephant, &c. they are placed as low as the ears, and even lower. Theſe animals likewiſe want the occiput, and the top of the head is of very ſmall extent. The jaws, which form the greateſt portion of the muzzle, are large in proportion to the ſmallneſs of the brain. The length of the muzzle varies in different animals; in ſolipede animals it is very long; it is ſhort in the oran otan, and in man it does not exiſt at all: no beard grows on the muzzle; this part is wanting in every animal *.

Man then alone, of all the animals with which we are acquainted, can conſtantly and uniformly ſupport himſelf in the erect poſture; and whatever the ingenious and learned writer of Ancient Metaphyſics has advanced in favour of ſo ſtrange a hypotheſis, we cannot believe that even in his earlieſt and rudeſt ſtate of civilization man could ever have been a quadruped. We are aware that Kotzebue, in the entertaining work in which he relates his exile to Siberia, ſpeaks of an idiot he ſaw on his return, that went on all fours, with as much eaſe as if it were his natural attitude, but we do not conſider this ſingle inſtance as affording a proof that ſuch would be the attitude of man in a ſtate of nature.

"There are (ſays Cuvier) ſeveral circumſtances in the anatomical ſtructure of man, which ſufficiently prove that nature never intended him to walk on all fours. In this ſituation his eyes would be directed towards the earth; but not being poſſeſſed of the cervical ligament that is found in quadrupeds, he would not be able to ſupport his head. His inferior extremities would be too much elevated in proportion to his arms, and his feet too ſhort

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* Daubenton.

Man.

ſhort to enable him conveniently to bend them like other animals who tread upon their toes. His [illegible] is [illegible] that it would impede the free motion of his arms. He could not creep [illegible] with [illegible] facility as apes. [illegible], like them, the great toe ſe-parated from the [illegible] could be placed like theirs, on account of the [illegible] *.

[illegible]

The body of a well ſhaped man ought to be ſquare, the muſcles ought to be ſtrongly marked, the contour of the members boldly delineated, and the features of the face well defined. In women, all the parts are more rounded and ſofter, the features are more delicate, and the complexion is brighter. To man belong ſtrength and majeſty: gracefulneſs and beauty are the portions of the other ſex. The [illegible] are [illegible] to each will be found in the deſcription of the human ſkeleton, under the article Anatomy.

7
Nobleneſs of the form and attitude of man.

Every thing in both ſexes points them out as the ſovereigns of the earth; even the external appearance of man declares his ſuperiority to other creatures. His body is erect; his attitude is that of command; his auguſt countenance, which is turned towards heaven, bears the impreſſions of his dignity. The image of his ſoul is painted in his face; the excellence of his nature pierces through the material organs, and gives a fire and animation to the features of his countenance. His majeſtic deportment, his firm and emboldened gait, announce the nobleneſs of his rank. He touches the earth only with his extremity, he views it only at a diſtance, and ſeems to deſpiſe it. It has been juſtly obſerved, that the countenance of man is the mirror of his mind. In the looks of no animal are the expreſſions of paſſions painted with ſuch energy and rapidity, and with ſuch gentle gradations and ſhades, as in that of man. We know, that in certain emotions of the mind, the blood riſes to the face, and produces bluſhing; and that in others the countenance turns pale. Theſe two ſymptoms, the appearance of which depends on the ſtructure and the tranſparency of the reticulum, eſpecially redneſs, conſtitute a peculiar beauty. In our climates, the natural colour of the face of a man in good health is white, with a lively red ſuffuſed upon the cheeks. Paleneſs of the countenance is always a ſuſpicious ſymptom. That colour which is ſhaded with black is a ſign of melancholy; and conſtant and univerſal redneſs is a proof that the blood is carried with too much impetuoſity to the brain. A livid colour is a morbid and dangerous ſymptom; and that which has a tint of yellow is a ſign of jaundice or repletion of bile. The colour of the ſkin is frequently altered by want of ſleep or of nouriſhment, or by looſeneſs and diarrhœa *.

8
Diverſity of the human features.

Notwithſtanding the general ſimilitude of countenance in nations and families, there is a wonderful diverſity of features. No one, however, is at a loſs to recollect the perſon to whom he intends to ſpeak, provided he has once fully ſeen him. One man has liveline ſs and gaiety painted in his countenance, and announces beforehand, by the cheerfulneſs of his appearance, the character which he is to ſupport in ſociety. The tears which bedew the cheeks of another man would excite compaſſion in the moſt unfeeling heart. Thus the face of man is the rendezvous of the ſymptoms both of his moral and phyſical affections: tranquillity, anger, threatening, joy, [illegible], jealouſy, [illegible], contempt, [illegible], irony, arrogance, tears, terror, aſtoniſhment, horror, fear, ſhame or humiliation, [illegible] compaſſion, meditation, particular convulſions, ſleep, death, &c. [illegible] in the [illegible].

9
[illegible] the features.

When the [illegible] all the features of the face are in a ſtate of profound tranquillity. Their proportion, harmony, and union, point out the ſerenity of the thoughts. But when the ſoul is agitated, the human face becomes a living canvas, whereon the paſſions are repreſented with equal delicacy and energy; where every emotion of the ſoul is expreſſed by ſome feature, and every action by ſome mark; the lively impreſſion of which anticipates the will, and reveals by pathetic ſigns our ſecret agitation, and thoſe intentions which we are anxious to conceal. It is in the eyes that the ſoul is painted in the ſtrongeſt colours, and with the niceſt ſhades. The different colours of the eyes are, dark hazel, light hazel, green, blue, gray, and whitiſh gray. The moſt common of theſe colours are hazel and blue, both of which are often found in the ſame eye. Eyes which are commonly called black, are only dark hazel; they appear black in conſequence of being contraſted with the white of the eye. Whereever there is a tint of blue, however ſlight, it becomes the prevailing colour, and outſhines the hazel, with which it is intermixed, to ſuch a degree, that the mixture cannot be perceived without a very narrow examination. The moſt beautiful eyes are thoſe which appear black or blue. In the former there is more expreſſion and vivacity; in the latter more ſweetneſs, and perhaps delicacy.

10
The eyes.

11
The eye-brows.

Next to the eyes, the parts of the face by which the phyſiognomy is moſt ſtrongly marked, are the eyebrows. Being of a different nature from the other parts, their effect is increaſed by contraſt. They are like ſhade in a picture, which gives relief to the other colours and forms.

12
The forehead.

The forehead is one of the largeſt parts of the face, and one that contributes moſt to its beauty. Every body knows of how great importance the hair is in the phyſiognomy, and that baldneſs is a very great defect. When old age begins to make its approaches, the hair which firſt falls off is that which covers the crown of the head and the parts above the temples. We ſeldom ſee the hair of the lower part of the temples, or of the back of the head, completely fall off. Baldneſs is peculiar to men; women do not naturally loſe their hair, though it becomes white as well as that of men at the approach of old age.

13
The noſe.

The noſe is the moſt prominent feature of the face; but as it has very little motion, and that only in the moſt violent paſſions, it contributes leſs to the expreſſion than to the beauty of the countenance. The noſe is ſeldom perpendicular to the middle of the face, but for the moſt part is turned toward the one ſide or the other. The cauſe of this irregularity, which according to painters, is perfectly conſiſtent with beauty, and of which even the want would be a deformity, appears to be frequent preſſure on one ſide of the cartilage of the child's noſe againſt the breaſt of the mother when

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* Buffon.

[illegible] At the early period of life the cartilages and bones have acquired very little ſolidity, and are eaſily bent.

13 [illegible] Next to the eyes, the mouth and lips have the greateſt motion and expreſſion. The motions of theſe parts are under the influence of the paſſions. The mouth, ſet off by the vermilion of the lips, and the enamel of the teeth, marks, by the various forms it aſſumes, their different characters; and this feature receives animation from the organ of the voice, which communicates to it more life and expreſſion than is poſſeſſed by any other feature. The cheeks are uniform features, and have no motion, and little expreſſion, except what ariſes from that involuntary redneſs or paleneſs with which they are covered in different paſſions, ſuch as ſhame, anger, pride, and joy, producing redneſs; and fear, terror, and ſorrow, producing paleneſs.

14 [illegible] In different paſſions, the whole head aſſumes different poſitions, and is affected with different motions. It hangs forward during ſhame, humility, and ſorrow; it inclines to one ſide in languor and compaſſion; it is elevated in pride, erect and fixed in obſtinacy and ſelf-conceit. In aſtoniſhment, it is thrown backwards; and it moves from ſide to ſide in contempt, ridicule, anger, and indignation. In grief, joy, love, ſhame, and compaſſion, the eyes ſwell and the tears flow. The effuſion of tears is always accompanied with an extenſion of the muſcles of the face, which opens the mouth. In ſorrow, the corners of the mouth are depreſſed, the under-lip riſes, the eyelids fall down, the pupil of the eye is round and half concealed by the eyelid. The other muſcles of the face are relaxed, ſo that the diſtance between the eyes and the mouth is greater than ordinary; and conſequently the countenance appears to be lengthened. In fear, terror, conſternation, and horror, the forehead is wrinkled, the eyebrows are raiſed, the eyelids are opened as wide as poſſible, the upper-lid uncovers a part of the white above the pupil, which is depreſſed and partly concealed by the under lid. At the ſame time the mouth opens wide, the lips recede from each other, and diſcover the teeth both above and below. In contempt and deriſion, the upper-lip is raiſed to one ſide and expoſes the teeth, while the other ſide of the lip moves a little, and wears the appearance of a ſmile. The noſtril on the elevated ſide of the lip ſhrivels up, and the corner of the mouth falls down. The eye on the ſame ſide is almoſt ſhut, while the other is open as uſual; but the pupils of both are depreſſed, as when one looks down from a height. In jealouſy, envy, and malice, the eyebrows fall down and are depreſſed. The upper lip is elevated on both ſides, while the corners of the mouth are a little depreſſed, and the under-lip riſes to join the middle of the upper. In laughter, the corners of the mouth are drawn back, and a little elevated; the upper parts of the cheeks riſe; the eyes are more or leſs cloſed; the upper lip riſes, and the under one falls down; the mouth opens, and in caſes of immoderate laughter, the ſkin of the noſe wrinkles. That gentler and more gracious kind of laughter which is called *ſmiling*, is ſeated wholly in the parts of the mouth. The under lip riſes; the angles of the mouth are drawn back, the cheeks are [illegible] up, the eyelids approach one another, and a [illegible] is obſerved in the eyes. It is very ex[illegible] laughter may be excited either by a moral cauſe without the immediate action of external objects, or by a particular irritation of the nerves without any feeling of joy. Thus an involuntary laugh is excited by a ſlight tickling of the lips, of the palm of the hand, of the ſole of the foot, of the armpits, and in ſhort, below the middle of the ribs. We laugh when two diſſimilar ideas, the union of which was unexpected, are repreſented to the mind at the ſame time, and when one or both of theſe ideas, or their union, includes ſome abſurdity which excites an emotion of diſdain mingled with joy. In general, ſtriking contraſts never fail to produce laughter.

A change is produced in the features of the countenance by weeping as well as by laughing. In weeping, the under lip is ſeparated from the teeth; the forehead is wrinkled; the eyebrows are depreſſed; the dimple which gives a gracefulneſs to laughter, forſakes the cheek; the eyes are unuſually compreſſed, and bathed in tears. In laughter, tears not unfrequently appear, but they flow more ſeldom and leſs copiouſly.

The arms, hands, and every part of the body, contribute to the expreſſion of the paſſions. In joy, for inſtance, all the members of the body are agitated with quick and varied motions. In languor and ſorrow, the arms hang down, and the whole body remains fixed and immoveable. In admiration and ſurpriſe, a ſimilar ſuſpenſion of motion is likewiſe obſerved. In love and hope, the head and eyes are raiſed to heaven, as if to ſolicit the wiſhed-for good; the body bears forward as if to approach it; the arms are ſtretched out, and ſeem to ſeize before hand the deſired object. On the contrary, in fear, hatred and horror, the arms ſeem to puſh backward, and repel the object of averſion. We turn away our head and eyes, as if to avoid the ſight of it; we ſtart back as if to ſhun it *.

For the *beauty* of the human form, ſee BEAUTY and DRAWING.

16 Origin of family affection;

At his birth, man is the moſt feeble of all animals; he cannot ſubſiſt but by the care of his parents, for which he has occaſion for a much longer time than other animals. Hence the natural continuance of conjugal affection, and the intimate ties that bind together the parents with each other and with their children. As the father partakes with his companion in the care of educating their children, man ought more than any other animal, to live in a ſtate of monogamy, the propriety of which is demonſtrated by the nearly equal number of male and female children that on an average come into the world.

17 And of ſocial intercourſe.

Man is formed for ſociety, which is rendered eſſentially neceſſary to him from his natural weakneſs, and without which he would not be able to reſiſt the wild beaſts of the foreſt, nor procure for himſelf the neceſſaries of life: for he has no arms offenſive or defenſive, ſuch as horns, claws, ſcales; nor any thing that reſembles that faculty which we call inſtinct, which many ſpecies of animals derive from nature herſelf, and by which they conſtruct themſelves habitations, or change their climate, according to the diverſity of the ſeaſons.

18 Of language and arts.

All gregarious animals have a certain language by which they can in ſome meaſure communicate their thoughts to each other; but man enjoys in this reſpect two remarkable prerogatives. 1. The faculty of articulating ſounds, which no quadruped enjoys in common with him, and which muſt give to his language an infinite

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* Buffon.

finite variety and preciſion. 2. An unlimited power of generalizing his ideas, and of fixing and retaining abſtract notions by means of words. On this depend memory and judgement, which latter is the foundation of reaſon, or of that faculty of reflecting and combining ideas, which is conſidered as peculiar to man.

It is by means of language that man communicates to the reſt of his ſpecies the obſervations and diſcoveries made by each individual, and this communication is the great ſource of the infinite perfectibility of the human race. The arts are the offspring of ſcience, produced by the combination of theſe obſervations and diſcoveries, and by that addreſs which reſults from the peculiar conformation of our hands and fingers.

By means of the arts man has learned to procure for himſelf ſubſiſtence, and to provide againſt the inclemencies of the weather in every climate of the earth. Thus, he has eſtabliſhed himſelf every where; while the reſt of the animal creation have each a determinate ſpace, beyond which they cannot paſs without the protection of man, who has tranſported with him the domeſtic kinds, and has been followed in ſpite of himſelf by the paraſitical tribes.

19
Progreſs of civilization.

The nations who eſtabliſhed themſelves in the icy regions of the north, not finding there enough of vegetable nouriſhment, nor paſture ſufficiently abundant for cattle, derived all their ſubſiſtence from the chaſe or fiſhing. Obliged to devote all their time to the procuring of this ſubſiſtence, and multiplying but ſlowly, from the deſtruction of the game which ſurrounded them, it is not ſurpriſing that among them man has made leaſt progreſs in arts and civilization. Their arts were confined to the conſtruction of huts, to the preparing of ſkins for their covering, and to the manufacture of ſpears and arrows. The inhabitants of the northern and eaſtern parts of Siberia, and the ſavages of North America, are almoſt the only people who are in this low ſtate of civilization.

Other nations learned to ſecure for themſelves in the poſſeſſion of numerous herds, certain ſubſiſtence, and to find ſufficient leiſure to increaſe their knowledge; but their wandering life, in ſearch of new paſtures and more agreeable climates, kept them ſtill within very narrow limits with reſpect to civilization. They, however, acquired more induſtry in the conſtruction of their habitations, and learned the value of property; the natural conſequences of which were riches, and an inequality of condition. The Laplanders in the north of Europe, the Tartars who inhabit the vaſt extent of country in the interior of Aſia, the Bedouin Arabs who occupy the ſands of Arabia and the north of Africa, the Caffres and Hottentots in the ſouth of Africa, are the principal wandering tribes with which we are acquainted.

Man did not multiply to any great extent, nor riſe to any great perfection in the arts and ſciences, till landed property allowed him to pay attention to agriculture, by means of which the labour of one part of the community could procure ſubſiſtence for the reſt, and leave them ſufficient leiſure to employ themſelves in arts leſs neceſſary than ornamental. Laſtly, The invention of money, by facilitating the transfer of commodities, brought to the higheſt pitch induſtry, luxury, and inequality of fortune, and by a neceſſary conſequence, the vices of effeminacy, and the rage of ambition.

Man living in every climate, fearing no other animal, but having even deſtroyed or confined to the deſerts all thoſe who could moleſt him, became incomparably more numerous than any other tribe of large animals. Hence, having few other animals to combat, he ſoon began to make war on his own ſpecies, and he may be conſidered as almoſt the only animal that is perpetually at war with thoſe of the ſame tribe. Savages diſpute the foreſts in which they follow the chaſe; Nomads, the paſtures where they feed their cattle; more civilized people combat for the monopoly of commerce or the prerogatives of pride and ambition. Hence the neceſſity of government, to regulate national diſputes, and to reduce to certain rules the quarrels of individuals *.

20
Marks that diſtinguiſh varieties of the human ſpecies.

It is chiefly the features of the countenance, and the colour of the ſkin, that ſerve to diſtinguiſh the varieties of the human ſpecies. Independently of particular and individual differences, the human race may be diſtinguiſhed into five principal varieties, the diſtinctive characters of which are deeply ſtamped, and appear to reſiſt even the powerful influence of climate. In fact we ſee, under the ſame parallel of latitude, and in the ſame country, exiſting together for a number of ages, the dark Hungarian or gypſy, and the faireſt people of Europe; the copper-coloured Peruvian, the brown Malay, and the almoſt white Abyſſinian, in the ſame zone that is inhabited by the blackeſt people in the univerſe. The inhabitants of Van Diemen's land are black, while the Europeans of the ſame degree of north latitude are white; and the inhabitants of the Malabar coaſt, though placed beneath a ſky much hotter than the inhabitants of Siberia, are not browner than theſe latter. The Dutch who colonized the Cape of Good Hope, have not, during two centuries, acquired the ſame colour with the Hottentots who people that country; and the Parſi remain white in the midſt of the olive-coloured Hindoos.

The colouring matter ſeated in the mucous membrane below the ſkin, is not the only diſtinctive character that marks the varieties of the human ſpecies, as in each of them there is a peculiar form, diſtinguiſhed by general and conſtant marks, depending on the conformation of the bones. The muzzle of the Negro; the very prominent cheek-bones of the Calmuck; the flattened ſkull and noſe of the Carribbee Indian; the oblique eyes of the Japaneſe and Chineſe, do not appear owing to art, like the lengthened ears or the tattooed ſkin of the natives of the South ſea iſlands. The fair or red colour of the hair in Europeans; the blue or gray eyes of the north, are almoſt never ſeen, except in a few morbid caſes, in any other varieties. The hair of all the reſt is very black, even from infancy; ſleek and thick in all the Mongul nations, the Malays, and the Americans, both of the ſouth and north, but woolly in Negroes and Hottentots; the beard which is late and thin in all the Monguls, exiſts naturally throughout the American tribes, though, as among moſt other ſavage people, all the Carribs eradicate it from their youth, which has induced a ſuppoſition that all theſe ſavage people are naturally beardleſs †.

Mankind with reſpect to their varieties, have been

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* Cuvier.

† Ibid.

very philosophically divided by [illegible]. Linnæus makes five varieties, viz. 1. *Americans*, of copper-coloured complexion, choleric constitution, and remarkably erect. 2. *Europeans*; of fair complexion, sanguine temperament, and brawny form. 3. *Asiatics*; of footy complexion, melancholy temperament, and rigid fibre. 4. *Africans*; of black complexion, phlegmatic temperament, and relaxed fibre: and 5. *Monstrosi*; comprehending, 1. *Alpini*; the inhabitants of the northern mountains: they are small in stature, active, and timid in their dispositions. 2. *Patagonici*; the Patagonians of South America, of vast size, and indolent in their manners. 3. *Monorchides*; the Hottentots, having one testicle extirpated. 4. *Imberbes*; most of the American nations, who eradicate their beards and the hair from every part of the body except the fcalp. 5. *Macrocephali*. 6. *Plagiocephali*; the Canadian Indians, who have the fore part of their heads flattened, when young, by compression.

By Gmelin. The following arrangement of the varieties in the human fpecies, is offered by Gmelin as more convenient than that of Linnæus. 1. White, (*Hom. Albus.*) Formed by the rules of fymmetrical elegance and beauty; or at least what we confider as fuch.—This divifion includes almoft all the inhabitants of Europe; thofe of Afia on this fide of the Oby, the Cafpian, Mount Imaus, and the Ganges; likewife the natives of the north of Africa, of Greenland, and the Efquimaux.

2. Brown: (*Hom. Badius.*) Of a yellowifh brown colour; has fcanty hairs, flat features, and fmall eyes.—This variety takes in the whole inhabitants of Afia not included in the preceding divifion.

3. Black: (*Hom. Niger.*) Of black complexion; has frizzly hair, a flat nofe, and thick lips.—The whole inhabitants of Africa, excepting thofe of its more northern parts.

4. Copper-coloured: (*Hom. Cupreus.*) The complexion of the fkin refembles the colour of copper not burnifhed.—The whole inhabitants of America, except the Greenlanders and Efquimaux.

5. Tawny: (*Hom. Fuscus.*) Chiefly of a dark blackifh-brown colour; having a broad nofe, and harfh coarfe ftraight hair.—The inhabitants of the fouthern iflands, and of moft of the Indian iflands.

By Buffon. Buffon enumerates fix varieties. 1. The polar or Lapland race; 2. The Tartar or Mongul; 3. The fouthern Afiatic; 4. The European; 5. The Ethiopian; and 6. The American. For an account of thefe varieties fee Buffon's Natural Hiftory by Smellie, and Herder's Outlines of the Philofophy of the Hiftory of Man.

24 By Virey. Virey, the difciple of Buffon, diftributes man into five varieties, 1. The Celtic race, containing moft of the Europeans. 2. The Mongul and Lapland. 3. Malay. 4. The Negro and Hottentot; and 5. The [illegible]. For his defcription of thefe varieties, with portraits illuftrating them, fee his *Hiftoire Naturelle du Genre Humain*, tom. i. p. 129.

By Cuvier. Of all the divifions which we have feen, we confider that given by Cuvier, in his *Tableau Elementaire de l'Hiftoire Naturelle des Animaux*, as the leaft exceptionable; and as it is very concife, we fhall here give a tranflation of it. Cuvier's enumeration is as follows.

White race. *The white race*, with oval vifage, long hair, pointed nofe; to which belong the polifhed nations of Europe, which appears to us the moft comely of all the varieties, is alfo far fuperior to the reft in ftrength of genius, in courage, and activity. The Tartars, properly fo called, from whom the Turks are defcended; the Circaffians, and other people about Mount Caucafus, who are the fineft of the human race; the Perfians, the native inhabitants of Hindoftan, the Arabians, the Moors who inhabit the north of Africa, and the Abyffinians, who appear, as well as the Jews, to be derived from the Arabians, belong to the fame race with the Europeans. Thefe nations are larger and fairer in the north, their hair is there fair, their eyes blue; whereas in the fouth they are dark, and often very brown, and their hair and eyes are black. There are intermixtures of thefe colours in the more temperate regions.

Lapland race. 2. All the north of the two continents is peopled with men that are very dark, with flat vifage, black hair and eyes; with a body thick and extremely fhort. To this belong the Laplanders in Europe, the Samoiedes, Oftiacs, Tfchutfki in Afia; the Greenlanders and Efquimaux in America. The inhabitants of Finland refemble thefe almoft in every circumftance, except that their height equals that of the European. The Hungarians and feveral wandering tribes of Afia, have a fimilar form, and fimilar language and manners with the Fins.

Mongul race. 3. The *Mongul* race, to which belong moft of the people we call Tartars, as the Monguls, the Mantcheoux, the Calmucs, &c. and who have extended their conquefts from China to Hindoftan, and are even advanced as far as the frontiers of Europe, is characterized by a flat forehead, a fmall nofe, prominent cheek-bones, black hair, very thin beard, fmall oblique eyes, thick lips, and a colour more or lefs yellow.

The Chinefe and Japanefe, and the Indians beyond the Ganges, to whom we give the name of Malays, appear to hold a near refemblance to the Monguls. The iflands of the South fea, and the great continent of New Holland, are inhabited by original Malays. Thefe who live neareft the equator have the fkin almoft as black as the Negroes. Such are, among others, the Papons.

Negro race. 4. The *Negroes* inhabit all the coafts on the fouth of Africa from the river Senegal to the Red fea. Befides the blacknefs of their fkin, they are diftinguifhed by their flat nofe and forehead, their long muzzle, prominent cheek bones, and frizzled hair. They are blacker than the inhabitants of Guinea, and have the nofe exceffively long. Thofe of Congo are the moft comely. Towards the tropic of Capricorn they become a little paler, and take the name of Caffres. Almoft all the inhabitants of the eaftern coaft of Africa are of this fubvariety. The Hottentots form another fubdivifion, which is found in the moft fouthern point, and they have cheek-bones fo prominent, that their vifage appears triangular. Their colour is a brown olive.

It is fuppofed that the interior parts of Africa, which are very hilly, are inhabited by a race of white men like Abyffinians.

Copper race. 5. America was peopled with men of a copper colour, with long and coarfe hair, who, according to moft travellers, generally want the beard, and even the hair on the body. Others affures us that they eradicate them. It is alfo faid, that the fanciful form of their heads ariſe from the compreſſion they undergo in infancy. This race comprehends the ſavage nations of America, and the remaining inhabitants of Mexico and Peru. It is towards the ſouthern point of this continent that we find the talleſt race of men in the univerſe; but their height, which the earlier travellers repreſented as gigantic, ſcarcely exceeds ſix feet. Theſe are the people ſo celebrated under the name of Patagonians.

All theſe different varieties of men can intermix and produce children, who hold a mean between the forms and colours of their parents. Theſe intermixtures can again mix with the original races, and the produce approaches to theſe races according to the degree of mixture. All theſe progenies are prolific as well as their fathers and mothers.

It appears that there are ſometimes born in the different races of our variety, ſubjects of a milky whiteneſs, which is the effect of diſeaſe, and this colour is accompanied with feebleneſs of body and weakneſs of ſight. Some travellers have believed that theſe men form entire nations, which they have called Dariens in America, Dondos or Albinos, in Africa, and Chacklaras in India. See ALBINOS.

The different colours which diſtinguiſh the varieties of the human ſpecies, reſide not in the cuticle, but in the mucus and reticular membrane which is immediately below it *.

31 arieties of men not diſtinct ſpecies.

Blumenbach remarks, that ſome late writers ſeem doubtful whether the numerous diſtinct races of men ought to be conſidered as mere varieties, which have ariſen from degeneration, or as ſo many ſpecies altogether different. The cauſe of this ſeems chiefly to be, that they took too narrow a view in their reſearches, ſelected, perhaps, two races the moſt different from each other poſſible, and, overlooking the intermediate races that formed the connecting links between them, compared theſe two together; or, they fixed their attention too much on man, without examining other ſpecies of animals, and comparing their varieties and degeneration with thoſe of the human ſpecies. The firſt fault is, when one, for example, places together a Senegal negro and an European Adonis, and at the ſame time forgets that there is not one of the bodily differences of theſe two beings, whether hair, colour, features, &c. which does not gradually run into the ſame thing of the other, by ſuch a variety of ſhades, that no phyſiologiſt or naturaliſt is able to eſtabliſh a certain boundary between theſe gradations, and conſequently between the extremes themſelves.

The ſecond fault is, when people reaſon as if man were the only organized being in nature, and conſider the varieties in his ſpecies to be ſtrange and problematical, without reflecting that all theſe varieties are not more ſtriking or more uncommon than thoſe with which ſo many thouſands of other ſpecies of organized beings degenerate, as it were, before our eyes.

We cannot here enter into the merits of the queſtion, whether, conſidering the varieties of the human ſpecies which we have deſcribed, all theſe could have originated from one pair, as related in the Moſaic hiſtory. To thoſe who affect to diſbelieve the Moſaic account, it may be ſufficient to reply, that to the almighty power of the Divine Being it was not more difficult to change and modify the deſcendants of one man and one woman, in order to adapt them to the different regions of the earth which they were deſtined to occupy, than to create at the firſt five or ſix pairs placed in different ſituations, to be the progenitors of the nations that we now ſee inhabiting the globe.

32 This illuſtrated by a compariſon of man with ſwine.

On the nature and cauſes of the different colour of the ſkin, that characterizes the varieties of the human ſpecies, ſee the article COMPLEXION. On this ſubject we ſhall here add a curious compariſon between the human race and ſwine, by Profeſſor Blumenbach, intended to refute the ſecond error into which he conſiders writers have fallen, in treating of the varieties of man.

More reaſons, ſays he, than one have induced me to make choice of ſwine for this compariſon; but, in particular, becauſe they have a great ſimilarity, in many reſpects, to man; not however, in the form of their entrails, as people formerly believed, and therefore ſtudied the anatomy of the human body purpoſely in ſwine; ſo that even, in the 17th century, a celebrated diſpute, which aroſe between the phyſicians of Heidelberg and thoſe of Durlach, reſpecting the poſition of the heart in man, was determined, in conſequence of orders from government, by inſpecting a ſow, to the great triumph of the party which really was in the wrong. Nor is it becauſe in the time of Galen, according to repeated aſſertions, human fleſh was ſaid to have a taſte perfectly ſimilar to that of ſwine; nor becauſe the fat, and the tanned hides of both, are very like to each other; but becauſe both, in general, in regard to the economy of their bodily ſtructure, taken on the whole, ſhew unexpectedly, on the firſt view, as well as on cloſer examination, a very ſtriking ſimilitude.

Both, for example, are domeſtic animals; both *omnivora;* both are diſperſed throughout all the four quarters of the world; and both conſequently are expoſed, in numerous ways, to the principal cauſes of degeneration ariſing from climate, mode of life, nouriſhment, &c.: both, for the ſame reaſon, are ſubject to many diſeaſes rarely found among other animals than men and ſwine, ſuch as the ſtone in the bladder; or to diſeaſes excluſively peculiar to theſe two, ſuch as the worms found in meaſled ſwine.

Another reaſon, continues he, why I have made choice of ſwine for the preſent compariſon is, becauſe the degeneration and deſcent from the original race are far more certain in theſe animals, and can be better traced, than in the varieties of other domeſtic animals. For no naturaliſt, I believe, has carried his ſcepticiſm ſo far as to doubt the deſcent of the domeſtic ſwine from the wild boar; which is much the more evident, as it is well known that wild pigs, when caught, may be eaſily rendered as tame and familiar as domeſtic ſwine: and the contrary alſo is the caſe; for if the latter by any accident get into the woods, they as readily become wild again; ſo that there are inſtances of ſuch animals being ſhot for wild ſwine, and it has not been till they were opened, and found caſtrated, that people were led to a diſcovery of their origin, and how, and at what time, they ran away. It is well aſcertained, that, before the diſcovery of America by the Spaniards, ſwine were unknown in that quarter of the world, and that they were afterwards carried thither from Europe. All the varieties, therefore, through which this animal has ſince degenerated, belong, with the original European race,

Man.

to one and the ſame ſpecies, and ſince no bodily difference is found in the human race, either in regard to ſtature, colour, the form of the ſkull, &c. as will preſently appear, which is not obſerved in the ſame proportion in the ſwine race, this compariſon, it is to be hoped, will ſilence thoſe ſceptics who have thought proper, on account of theſe varieties of the human ſpecies, to admit more than one ſpecies.

With regard to ſtature, the Patagonians, as is well known, have afforded the greateſt employment to anthropologiſts. The romantic tales, however, of the old travellers, and even the more modeſt relations of Engliſh navigators, have been doubted by other travellers, who on the ſame coaſt ſought in vain for ſuch children of Anak. But even admitting every thing ſaid of the ſize of theſe Patagonians, there is not among them nearly ſuch an exceſs of ſtature as that obſerved in many parts of America among the ſwine originally carried thither from Europe; and of theſe we ſhall mention particularly thoſe of Cuba, which are more than double the ſize of the original Europeans.

The natives of Guinea, Madagaſcar, New Holland, New Guinea, &c. are black; many American tribes are reddiſh brown, and the Europeans are white. An equal difference is obſerved among ſwine in different countries. In Piedmont, for example, they are black. When I paſſed, ſays our author, through that country, during the great fair for ſwine at Salenge, I did not ſee a ſingle one of any other colour. In Bavaria, they are reddiſh brown; in Normandy they are all white. Human hair is, indeed, ſomewhat different from ſwines briſtles, yet, in the preſent point of view, they may be compared with each other. Fair hair is ſoft, and of a ſilky texture; black hair is coarſer, and among ſeveral tribes, ſuch as the Abyſſinians, Negroes, and the inhabitants of New Holland, it is woolly, and moſt ſo among the Hottentots. In like manner, among the white ſwine in Normandy, as I was aſſured by an incomparable obſerver, Sulzer of Bonneburg, the hair on the whole body is longer and ſofter than among other ſwine; and even the briſtles on the back are very little different, but lie flat, and are only longer than the hair on the other parts of the body. They cannot, therefore, be employed by the bruſh-makers. The difference between the hair of the wild boar and the domeſtic ſwine, particularly in regard to the ſofter part between the ſtrong briſtles, is, as is well known, ſtill greater.

The whole difference between the cranium of a negro and that of an European, is not in the leaſt degree greater than that equally ſtriking difference which exiſts between the cranium of the wild boar and that of the domeſtic ſwine. Thoſe who have not obſerved this in the animals themſelves, need only to caſt their eye on the figure which Daubenton has given of both.

I ſhall paſs over, ſays Blumenbach, his national varieties which may be found among ſwine as well as among men, and only mention, that I have been aſſured by Mr Sulzer, that the peculiarity of having the bone of the leg remarkably long, as is the caſe among the Hindoos, has been remarked with regard to the ſwine in Normandy. They ſtand very long on their hind legs; their back, therefore, is higheſt at the rump, forming a kind of inclined plane, and the head proceeds in the ſame direction, ſo that the ſnout is not far from the ground. I ſhall here add, that the ſwine in ſome countries have degenerated into races which in ſingularity far exceed every thing that has been found ſtrange in bodily variety among the human race. Swine with ſolid hoofs were known to the ancients, and large herds of them are found in Hungary, Sweden, &c. In like manner the European ſwine, firſt carried by the Spaniards, in 1509, to the iſland of Cuba, at that time celebrated for its pearl fiſhery, degenerated into a monſtrous race, with hoofs which were half a ſpan in length.

From theſe facts our ingenious author concludes, that it is abſurd to allow the vaſt variety of ſwine to have deſcended from one original pair, and to contend that the varieties of men are ſo many diſtinct ſpecies.

33 Progreſs of human life.

No part of the natural hiſtory of man can be more intereſting than that which deſcribes the progreſſive improvement and decay of human life, from the cradle to the grave. This ſubject has been treated of in a moſt animated manner by Buffon, and we ſhall here give an abridgement of this part of his work.

34 Infancy.

Nothing (ſays M. Buffon) exhibits ſuch a ſtriking picture of our weakneſs, as the condition of an infant immediately after birth. Incapable of employing its organs, it requires aſſiſtance of every kind. In the firſt moments of our exiſtence, we preſent an image of pain and miſery, and are more weak and helpleſs than the young of any other animal. At birth, the infant paſſes from one element to another; when it leaves the gentle warmth of the tranquil fluid by which it was completely ſurrounded in the womb of the mother, it becomes expoſed to the impreſſions of the air, and inſtantly feels the effects of that active element. The air acting upon the olfactory nerves, and upon the organs of reſpiration, produces a ſhock ſomething like that of ſneezing, by which the breaſt is expanded, and the air admitted into the lungs. In the mean time, the agitation of the diaphragm preſſes upon the bowels, and the excrements are thus for the firſt time diſcharged from the inteſtines, and the urine from the bladder. The air dilates the veſicles of the lungs, and after being rarefied to a certain degree, is expelled by the ſpring of the dilated fibres reacting upon this rarefied fluid. The infant now reſpires, and articulates ſounds or cries.

Moſt animals are blind for ſome days after birth. Infants open their eyes to the light the moment they come into the world; but they are dull, fixed, and commonly blue. The new-born child cannot diſtinguiſh objects, becauſe he is incapable of fixing his eyes upon them. The organ of viſion is yet imperfect; the cornea is wrinkled; and perhaps the retina is too ſoft for receiving the images of external objects, and for communicating the ſenſation of diſtinct viſion. At the end of 40 days, the infant begins to hear and to ſmile. About the ſame time it begins to look at bright objects, and frequently to turn its eyes towards the window, a candle, or any light. Now likewiſe it begins to weep; for its former cries and groans were not accompanied with tears. Smiles and tears are the effect of two internal ſenſations, both of which depend on the action of the mind. Thus they are peculiar to the human race, and ſerve to expreſs mental pain or pleaſure, while the cries, motions, and other marks of bodily pain and pleaſure, are common to man and moſt of the other animals. Conſidering the ſubject as metaphyſicians, we ſhall find that pain and pleaſure form the

univerſal

Man. universal power which ſets all our paſſions in motion.

The ſize of an infant born at the full time is commonly 21 inches; and that *fœtus*, which nine months before was an imperceptible bubble, now weighs ten or twelve pounds, and ſometimes more. The head is large in proportion to the body; and this diſproportion, which is ſtill greater in the firſt ſtage of the fœtus, continues during the period of infancy. The ſkin of a new-born child is of a reddiſh colour, becauſe it is ſo fine and tranſparent as to allow a ſlight tint of the colour of the blood to ſhine through. The form of the body and members is by no means perfect in a child ſoon after birth: all the parts appear to be ſwollen. At the end of three days, a kind of jaundice generally comes on, and at the ſame time milk is to be found in the breaſts of the infant, which may be ſqueezed out by the fingers. The ſwelling decreaſes as the child grows up.

The liquor contained in the amnios leaves a viſcid whitiſh matter upon the body of the child. In this country we have the precaution to waſh the new-born infant only with warm water; but it is the cuſtom with whole nations inhabiting the coldeſt climates, to plunge their infants into cold water as ſoon as they are born, without their receiving the ſmalleſt injury. It is even ſaid that the Laplanders leave their children in the ſnow till the cold has almoſt ſtopped their reſpiration, and then plunge them into a warm bath. Among theſe people, the children are alſo waſhed thrice a day during the firſt year of their life. The inhabitants of northern countries are perſuaded that the cold bath tends to make men ſtronger and more robuſt, and on that account accuſtom their children to the uſe of it from their infancy. The truth is, that we are totally ignorant of the power of habit, or how far it can make our bodies capable of ſuffering, of acquiring, or of loſing.

The child is not allowed to ſuck as ſoon as it is born; but time is given for diſcharging the liquor and ſlime from the ſtomach, and the *meconium* or excrement, which is of a black colour, from the inteſtines. As theſe ſubſtances might ſour the milk, a little diluted wine mixed with ſugar is firſt given to the infant, and the breaſt is not preſented to it before 10 or 12 hours have elapſed.

The young of quadrupeds can of themſelves find the way to the teat of the mother: it is not ſo with man. The mother, in order to ſuckle her child, muſt raiſe it to her breaſts; and, at this feeble period of life, the infant can expreſs its wants only by cries.

New-born children have need of frequent nouriſhment. During the day, the breaſt ought to be given them every two hours, and during the night as often as they awake. At firſt they ſleep almoſt continually; and they ſeem never to awake but when preſſed by hunger and pain. Sleep is uſeful and refreſhing to them; and it is ſometimes conſidered as neceſſary to employ narcotic doſes, proportioned to the age and conſtitution of the child, for the purpoſe of procuring them repoſe. The common way of appeaſing the cries of children is by rocking them in the cradle; but this agitation muſt be very gentle, otherwiſe a great riſk is run of confuſing the infant's brain, and of producing a total derangement. It is neceſſary to their being in good health, that their ſleep be long and natural. It is poſſible, however, that they may ſleep too much, and thereby endanger their conſtitution. In that caſe, it would be proper to take them out of the cradle, and awaken them by a gentle motion, or by preſenting ſome bright object to their eyes. At this age we receive the firſt impreſſions from the ſenſes, which, without doubt, are more important during the reſt of life than is generally imagined. Great care ought to be taken to place the cradle in ſuch a manner that the child ſhall be directly oppoſite to the light, for the eyes are always directed towards that part of the room where the light is ſtrongeſt; and if the cradle be placed ſideways, one of them, by turning towards the light, will acquire greater ſtrength than the other, and the child will ſquint. For the firſt two months, no other food ſhould be given to the child but the milk of the nurſe; and when it is of a weak and delicate conſtitution, this nouriſhment alone ſhould be continued during the third or fourth month. A child, however robuſt and healthy, may be expoſed to great danger and inconvenience, if any other aliment is adminiſtered before the end of the firſt month. In Holland, Italy, Turkey, and the whole Levant, the food of children is limited to the milk of the nurſe for a whole year. The ſavages of Canada give their children ſuck for four, five, ſix, and ſometimes even ſeven years. In this country, as nurſes generally have not a ſufficient quantity of milk to ſatisfy the appetite of their children, they commonly ſupply the want of it by panada, or other light preparations.

Dentition. The teeth uſually begin to appear about the age of ſeven months. The cutting of theſe, although a natural operation, does not follow the common laws of nature, which acts continually on the human body without occaſioning the ſmalleſt pain, or even producing any ſenſation. Here a violent and painful effort is made, accompanied with cries and tears. Children at firſt loſe their ſprightlineſs and gaiety; they become ſad, reſtleſs, and fretful. The gums are red, and ſwelled; but they afterwards become white, when the preſſure of the teeth is ſo great as to ſtop the circulation of the blood. Children apply their fingers to their mouth, that they may remove the irritation which they feel there. Some relief is given, by putting into their hands a bit of ivory or coral, or of ſome other hard and ſmooth body, with which they rub the gums at the affected part. This preſſure, being oppoſed to that of the teeth, calms the pain for a moment, contributes to make the membrane of the gum thinner, and facilitates its rupture. Nature here acts in oppoſition to herſelf; and an inciſion of the gum muſt ſometimes take place, to allow a paſſage to the tooth. For the period of dentition, number of teeth, &c. ſee ANATOMY, N° 27.

25 Diſeaſes of infancy. When children are allowed to cry too long, and too often, ruptures are ſometimes occaſioned by the efforts they make. Theſe may eaſily be cured by the ſpeedy application of bandages; but if this remedy has been too long delayed, the diſeaſe may continue through life. Children are very much ſubject to worms. Some of the bad effects occaſioned by theſe animals might, according to Buchan, be prevented by giving them a little wine now and then, for fermented liquors have a tendency to prevent their generation.

Though the body is very delicate in the ſtate of infancy, it is then leſs ſenſible of cold than at any other period of life. The internal heat appears to be greater. The pulſe in children is much quicker than in adults, from which we are certainly entitled to infer, that the internal heat is greater in the ſame proportion.

37 Mortality of infants.

Till three years of age, the life of a child is very precarious. In the ſecond or third following years it becomes more certain, and at ſix or ſeven years of age a child has a better chance of living than at any other period of life. From the bills of mortality publiſhed at London, it appears, that of a certain number of children born at the ſame time, one-half of them die the three firſt years; according to which, one-half of the human race would be cut off before they are three years of age. But the mortality among children is not everywhere ſo great as in London. *M. Dupre du Saint-Maur*, from a great number of obſervations made in France, has ſhewn that half of the children born at the ſame time are not extinct till ſeven or eight years have elapſed.

Among the cauſes which have occaſioned ſo great a mortality among children, and even among adults, the ſmallpox may be ranked as the chief. But luckily the means of alleviating the effects of this terrible ſcourge are now univerſally known by inoculation, and ſtill more by the introduction of the cowpox.

38 Speech.

Children begin learning to ſpeak about the age of 12 or 15 months. In all languages, and among every people, the firſt ſyllables they utter are *ba*, *ba*, *ma*, *ma*, *pa*, *pa*, *taba*, *abada*; nor ought this to excite any ſurpriſe, when we conſider that theſe ſyllables are the ſounds moſt natural to man, becauſe they conſiſt of that vowel, and thoſe conſonants, the pronunciation of which require the ſmalleſt exertion in the organs of ſpeech. Some children at two years of age articulate diſtinctly, and repeat whatever is ſaid to them; but moſt children do not ſpeak till the age of two years and a half, or three years, and often later.

The life of man and of other animals is meaſured only from the moment of birth; they enjoy exiſtence, however, previous to that period, and begin to live in the ſtate of a fœtus. This ſtate is deſcribed and explained under the article ANATOMY, N° 113. The period of infancy, which extends from the moment of birth to about 12 years of age, has already been conſidered.

39 [illegible]

The period of infancy is followed by that of adoleſcence. This begins, together with puberty, at the age of 12 or 14, and commonly ends in girls at 15, and in boys at 18, but ſometimes not till 21, 23, and 25 years of age. According to its etymology (being derived from the Latin *adoleſcentia*), it is completed when the body has attained its full height. Thus, puberty becomes adoleſcence, and precedes youth. This is the ſpring of life; this is the ſeaſon of pleaſures, of loves, and of graces; but this ſmiling ſeaſon is of ſhort duration. Hitherto nature ſeems to have had nothing in view but the preſervation and increaſe of her work; ſhe has made no proviſion for the infant except what is neceſſary for life and growth. It has enjoyed a kind of vegetable exiſtence which was ſhut up within itſelf, and which it was incapable of communicating. In this firſt ſtage of life, reaſon is ſtill aſleep; but the principles of life ſoon multiply, and man has not only what is neceſſary to his own exiſtence, but what enables him to give exiſtence to others. This redundancy of life can no longer be confined, but endeavours to expand and diffuſe itſelf *.

* Buffon.

Thus far we have followed Buffon in his animated ſketch of the progreſs of human life; but here we muſt leave him for a while, as we conſider the picture he has given of the approach of puberty and its correſponding circumſtances to be leſs calculated to ſerve the purpoſes of ſcientific information, than to gratify idle and vicious curioſity, and rouſe thoſe paſſions which ſeldom require much excitement. The ſubjects of the procreation of the human ſpecies, of pregnancy and parturition, are ſtrictly medical, and are treated of in ſufficient detail under their proper heads in this work. Perhaps we ſhall be accuſed, by ſome of the philoſophiſts of the preſent age, of being too faſtidious in omitting ſo important and intereſting a part of the natural hiſtory of man; but we had rather incur the imputation of negligence, than introduce into an article that is intended for general readers any thing that may offend the niceſt delicacy.

Soon after the age of puberty the body of man attains its full ſtature. Some young people ceaſe to grow after 15 or 16; while others continue to increaſe in height till 20, or even 23. During this interval they are uſually very ſlender, but by degrees the limbs ſwell, and aſſume their proper ſhape; and before the age of 30, the body has generally attained its greateſt perfection with regard to ſtrength, conſiſtence, and ſymmetry. Adoleſcence is conſidered as terminating at the age of 20 or 25, and at this period (according to the uſual diviſion of man's life into ages), youth begins. This continues till the age of 30 or 35.

40 [illegible] of [illegible]

The ſtature of man varies conſiderably in different climates, and under different circumſtances. Authors are by no means agreed as to what ſhould be conſidered the medium height of the human body. Buffon ſtates it at from five feet or five feet and an inch, to five feet four inches, making the medium height about five feet two inches. Haller on the contrary, reckons the true medium height of men in the temperate climates of Europe to be about five feet five, or ſix inches. In general, women are ſeveral inches ſhorter than men. It has been remarked by Haller, that in mountainous countries, ſuch as Switzerland, the inhabitants of the plains are commonly much taller than thoſe of the higher ſituations. It is difficult to aſcertain with preciſion the actual limits of the human ſtature; but we may remark that in ſurveying the inhabited parts of the earth, we find more remarkable differences in the ſtature of different individuals of the ſame nation, than in the general height of different nations. In the ſame climate, among the ſame people, and often even in the ſame family, we find ſome individuals that are far above the medium ſtandard, and others as far below it. The former we call giants, and the latter dwarfs. See GIANT and DWARF (A).

The

(A) In addition to the relations of gigantic men given under GIANT, we ſhall here preſent our readers with Blair's

41 Manhood. The body having acquired its full height during the period of adoleſcence, and its full dimenſions in youth, remains for ſome years in the ſame ſtate before it begins to decay. This is the period of manhood, which extends from the age of 30 or 35 to that of 40 or 45 years. During this ſtage, the powers of the body continue in full vigour, and the principal change which takes place in the human figure ariſes from the formation of fat in different parts. Exceſſive fatneſs disfigures the body, and becomes a very cumberſome and inconvenient load.

42 Declining age. Phyſiologiſts give the name of old age to that period of life which commences immediately after the age of manhood and ends at death; and they diſtinguiſh green old age from the age of decrepitude. But in our opinion ſuch an extenſive ſignification of the word ought not to be admitted. We are not old men at the age of 40 or 45, and though the body then gives ſigns of decay, it has not yet arrived at the period of old age. M. Daubenton obſerves, that it would be more proper to call it the *declining age*, becauſe nature then becomes retrograde, the fatneſs and good plight of the body diminiſh, and certain parts of it do not perform their functions with equal vigour.

The age of decline is from 40 or 45, to 60 or 65 years of age. At this time of life, the diminution of the fat is the cauſe of thoſe wrinkles which begin to appear in the face and ſome other parts of the body. The ſkin, not being ſupported by the ſame quantity of fat, and being incapable, for want of elaſticity, of contracting, ſinks down and forms folds. In the decline of life, a remarkable change takes place alſo in viſion. In the vigour of our days, the cryſtalline lens, being thicker and more diaphanous than the humours of the eye, enables us to read letters of a very ſmall character at the diſtance of eight or ten inches. But when the age of decline comes on, the quantity of the humours of the eye diminiſhes, they loſe their clearneſs, and the tranſparent cornea becomes leſs convex. To remedy this inconvenience, we place what we wiſh to read at a greater diſtance from the eye; but viſion is thereby very little improved, becauſe the image of the object becomes ſmaller and more obſcure. Another mark of the decline of life is a weakneſs of the ſtomach, and indigeſtion, in moſt people who do not take ſufficient exerciſe in proportion to the quantity and quality of their food.

43 Old age. At 60, 63, or 65 years of age, the ſigns of decline become more and more viſible, and indicate old age. This period commonly extends to the age of 70, ſometimes to 75, but ſeldom to 80. When the body is extenuated and bent by old age, man then becomes crazy. Crazineſs therefore, is nothing but an infirm old age. The eyes and ſtomach then become weaker and weaker; leanneſs increaſes the number of the wrinkles, the beard and the hair become white; the ſtrength and the memory begin to fail.

After 70, or at moſt 80 years of age, the life of man is nothing but labour and ſorrow; ſuch was the language of David near 3000 years ago. Some men of ſtrong conſtitutions, and in good health, enjoy old age for a long time without decrepitude; but ſuch inſtances are not very common. The infirmities of decrepitude continually increaſe, and at length death concludes the whole. This fatal term is uncertain. The only concluſions which we can form concerning the duration of life, muſt be derived from obſervations made on a great number of men who were born at the ſame time, and who died at different ages.

The ſigns of decrepitude form a ſtriking picture of weakneſs, and announce the approaching diſſolution of the body. The memory fails, the fibres become hard, the nerves blunted; deafneſs and blindneſs take place; the ſenſes of ſmell, of touch, and of taſte, are deſtroyed; the appetite fails; the neceſſity of eating.

Blair's account of O'Brien, the Iriſh giant, who exhibited himſelf at London and Edinburgh a few years ago, and died very lately. He pretended to be nearly nine feet high. We inſert this account the more readily, as it exactly agrees with what we ourſelves obſerved when O'Brien was in Edinburgh.

"I viſited this Iriſhman (ſays Mr Blair,) on the 5th of May 1804, at Nº 11. Haymarket. He was of a very extraordinary ſtature, but not well formed. As he would not ſuffer a minute examination to be made of his perſon, it is impoſſible to give any other than a ſhort deſcription of him. He declined the propoſal of walking acroſs the room, and I believe was afraid of diſcovering his extreme imbecillity. He had the general aſpect of a weak and unreflecting perſon, with an uncommonly low forehead; for as near as I could aſcertain, the ſpace above his eye-brows, in a perpendicular line to the top of his head, did not exceed two inches. He told me his age was 38 years, and that moſt of his anceſtors, by his mother's ſide, were very large perſons. The diſproportionate ſize of his hands ſtruck me with ſurpriſe, and in this he ſeemed to make his principal boaſt. He refuſed to allow a caſt to be made of his hand, and ſaid it had been done many years ago; but as I have ſeen that caſt at Mr Bacon's, I am convinced the ſize is much too ſmall to repreſent his preſent ſtate of growth. All his joints were large, and perhaps rickety; his legs appeared ſwollen, miſhapen, and I thought, dropſical; however, he did not like my touching them. The feet were clumſy, and concealed as much as poſſible by high ſhoes. His limbs were not very ſtout, eſpecially his arms, and I judged that he had ſcarcely got the uſe of them; for, in order to lift up his hand, he ſeemed obliged to ſwing the whole arm, as if he had no power of raiſing it by the action of the deltoid muſcle. He certainly had a greater redundancy of bone than of muſcle, and gave me the impreſſion of a huge, overgrown, ſickly boy; his voice being rather feeble as well as his bodily energies, and his age appearing under that which he affirmed. Indeed I find he gave a different account of himſelf to different viſitors. The ſtate of his pulſe agreed with the general appearance of his perſon, viz. feeble, languid, and ſlow in its motions. With regard to his actual height, I felt anxious to detect the fallacy he held out of his being *nine feet!* Upon extending my arm to the utmoſt, I reached his eye-brow with my little finger: allowing his height to have been two inches and one-fourth above this, it could not be more in the whole than ſeven feet ten inches; ſo that I am perſuaded the common opinion, founded on the giant's own tale, is greatly exaggerated." *Philoſophical Magazine*, vol. xviii. p. 356.

Man. frequently that of drinking, are alone felt; after the teeth fall out, maſtication is imperfectly performed, and digeſtion is very bad; the lips fall inwards; the edges of the jaws can no longer approach each other; the muſcles of the lower jaw become ſo weak, that they are unable to raiſe and ſupport it. The body ſinks down; the ſpine is bent outward, and the vertebræ grow together at the anterior part; the body becomes externally leſs, the ſtrength fails; the decrepid wretch is unable to ſupport himſelf; he is obliged to remain on a chair, or ſtretched in his bed; the bladder becomes paralytic; the inteſtines loſe their ſpring; the circulation of the blood becomes ſlower; the ſtrokes of the pulſe no longer amount to the number of 80 in a minute as in the vigour of life, but are reduced to 24 and ſometimes fewer; reſpiration is ſlower; the body loſes its heat; the circulation of the blood ceaſes; death follows; and the dream of life is at an end.

Death. Nothing can be more humiliating to the pride and vanity of man than a compariſon of the ſtate to which his body is reduced by death, with that which it exhibits in the prime and vigour of youth. Let us contemplate a female in the prime of youth and beauty. That elegant voluptuous form, that graceful flexibility of motion, that gentle warmth, thoſe cheeks crimſoned with the roſes of delight, thoſe brilliant eyes darting rays of love, or ſparkling with the fire of genius; that countenance enlivened by ſallies of wit, or animated by the glow of paſſion, appear united, to form a moſt faſcinating being. A moment is ſufficient to deſtroy the illuſion. Senſe and motion ceaſe without any apparent cauſe; the body loſes its heat; the muſcles become flat, and the angular prominences of the bones appear; the luſtre of the eye is gone; the cheeks and lips are livid. Theſe, however, are but preludes of changes ſtill more horrible. The fleſh becomes ſucceſſively blue, green, and black. It attracts humidity, and while one portion evaporates in infectious emanations, another diſſolves into a putrid ſanies, which is alſo diſperſed. In a word, after a few ſhort days there remains only a ſmall number of earthy and ſaline principles. The other elements are diſperſed in air, and in water, to enter again into new combinations *.

Man has no right to complain of the ſhortneſs of life. Throughout the whole of living beings, there are few who unite in a greater degree all the internal cauſes which tend to prolong life to diſtant periods. The term of geſtation is very conſiderable; the rudiments of the teeth are very late in unfolding; its growth is ſlow, and is not completed before about 20 years have elapſed.—The age of puberty, alſo, is much later in man than in any other animal. In ſhort, the parts of his body, being compoſed of a ſofter and more flexible ſubſtance, are not ſo ſoon hardened as thoſe of inferior animals. Man, therefore, ſeems to receive at his birth the germ of a long life; if he reaches not the diſtant period which nature ſeemed to promiſe him, it muſt be owing to accidental cauſes foreign to himſelf. Inſtead of ſaying that he has finiſhed his life, we ought rather to ſay that he has not completed it.

* Cuvier's Comp. Anat. i. 2.

45 The natural and total duration of life is in ſome meaſure proportioned to the period of growth. A tree or an animal which ſoon acquires its full ſize, decays much ſooner than another which continues to grow for a longer time. It is true that the life of animals is eight times longer than the period of their growth, we might conclude that the boundaries of human life may be extended to a century and a half.

On the ſubject of longevity, and the general circumſtances on which it depends, we have already treated under the article LONGEVITY, and have there given a liſt of a great number of perſons who have been celebrated for the length of their lives. To this liſt we ſhall add a few more names in the note below (B); but on the general ſubject of longevity, we ſhall

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(B) William Lecomte, a ſhepherd, died ſuddenly in 1776, in the county of Caux in Normandy, at the age of 110. Cramers, phyſician to the emperor, ſaw at Temeſwar two brothers, the one aged 110, and the other 112, both of whom were fathers at that age. St Paul the hermit was 113 at his death. The Sieur Iſwan-Horwaths, knight of the order of St Louis, died at Saar-Albe in Lorrain in 1775, aged almoſt 111. He was a great hunter. He undertook a long journey a ſhort time before his death, and performed it on horſeback. Roſine Iwiwarouſka died at Minſk in Lithuania at the age of 113. Fockjel Jonas died in the year 1775, aged 113. Marſk Jonas died at Vilejac in Hungary, aged 119. John Niethen of Bakler in Zealand lived to the age of 120. Eleonora Spicer died in 1773, in Virginia, aged 121. John Argus was born in the village of Laſtua in Turkey, and died in 1779, at the age of 123, having ſix ſons and three daughters, by whom he had poſterity to the fifth generation. They amounted to the number of 160 ſouls, and all lived in the ſame village. His father died at the age of 120. In December 1777, there lived in Devonſhire a farmer named John Brookey, who was 134 years of age, and had been fifteen times married. The Philoſophical Tranſactions mention an Engliſhman called Eccleſton, who lived to the age of 143. Another Engliſhman, named Effingham, died in 1757 at the age of 144. Niels Jukens of Hamerſet in Denmark died in 1764, aged 146. Chriſtian Jacob Drakemberg died in 1770 at Archuſen, in the 146th year of his age. This old man of the north was born at Stavangar in Norway in 1624, and at the age of 130 married a widow of 60. In Norway ſome men have lived to the age of 150. John Rovin, who was born at Szatlova-Carantz-Batcher, in the bannat of Temeſwar, lived to the age of 172, and his wife to that of 164, having been married to him for 147 years. When Rovin died, their youngeſt ſon was 99 years of age. Peter Zorten a peaſant, and a countryman of John Rovin, died in 1724 at the age of 185. His youngeſt ſon was then 97 years of age. The hiſtory and whole length pictures of John Rovin, Henry Jenkins, and Peter Zorten, are to be ſeen in the library of S. A. R. Prince Charles at Bruſſels; and engravings of Rovin and Zorten, with a ſhort account of them, are given in Sir John Sinclair's "Code of Health and Longevity." Profeſſor Hanovius at Dantzic, mentions in his nomenclature an old man who lived to the age of 184; and another, then alive, had attained the extraordinary age of 186. For other inſtances, ſee Sir J. Sinclair's work above mentioned.

ſhall add nothing to what has been ſaid under that head, except the portrait of a man deſtined for longevity, drawn by the celebrated Hufeland.

46 rtrait of man med for ngevity.

He has a proper and well proportioned ſtature, without being too tall. He is rather of the middle ſize, and ſomewhat thick ſet. His complexion is not too florid; at any rate, too much ruddineſs in youth is ſeldom a ſign of longevity. His hair approaches rather to the fair than the black; his ſkin is ſtrong, but not rough. His head is not too big; he has large veins at the extremities, and his ſhoulders are rather round than flat. His neck is not too long; his belly does not project, and his hands are large, but not too deeply cleft. His foot is rather thick than long, and his legs are firm and round. He has alſo a broad arched cheſt, a ſtrong voice, and the faculty of retaining his breath for a long time without difficulty. In general, there is a complete harmony in all his parts. His ſenſes are good, but not too delicate; his pulſe is clear and regular. His ſtomach is excellent, his appetite good, and digeſtion eaſy. He eats ſlowly, and has not too much thirſt, which is always a ſign of a rapid conſumption. He is ſerene, active, ſuſceptible of joy, love, and hope, but inſenſible to the impreſſions of hatred, anger, and avarice. His paſſions never become too violent. If he gives way to anger, he experiences an unuſual flow of warmth, a kind of gentle fever, without any overflowing of the gall. He is fond of employment, particularly calm meditation, and agreeable ſpeculations; is an optimiſt; a friend to natural affections, and domeſtic felicity; has no thirſt after honours or riches, but is ſatisfied with his lot *.

M. Daubenton has given a table of the probabilities of the duration of life, of which the following is an abridgement. Of 23,994 children born at the ſame time, there will probably die,

In one year - - -	7998
Remaining $\frac{2}{3}$ or 15.996.	
In eight years - -	11,997
Remaining $\frac{1}{2}$ or 11,997.	
In 38 years - - -	15,996
Remaining $\frac{1}{3}$ or 7998.	
In 50 years - - -	17,994
Remaining $\frac{1}{4}$ or 5998.	
In 61 years - - -	19.995
Remaining $\frac{1}{6}$ or 3999.	
In 70 years - - -	21.595
Remaining $\frac{1}{10}$ or 2399.	
In 80 years - - -	22.395
Remaining $\frac{1}{40}$ or 599.	
In 90 years - - -	23.914
Remaining $\frac{1}{300}$ or 79.	
In 100 years - - -	23,992
Remaining [illegible] or 2.	

47 Recapitulation.

It thus appears, that a very ſmall number of men indeed paſs through all the periods of life, and arrive at the goal marked out by nature. Innumerable cauſes accelerate our diſſolution. The life of man conſiſts in the activity and exerciſe of his organs, which grow up and acquire ſtrength during infancy, adoleſcence, and youth. No ſooner has the body attained its utmoſt perfection, than it begins to decline. Its decay is at firſt imperceptible, but in progreſs of time the membranes become cartilaginous, and the cartilages acquire the conſiſtence of bone; the bones become more ſolid, and all the fibres are hardened. Almoſt all the fat waſtes away; the ſkin becomes withered and ſcaly; wrinkles are gradually formed; the hair grows white; the teeth fall out; the face loſes its ſhape; the body is bent, and the colour and conſiſtence of the cryſtalline humour become more perceptible. The firſt traces of this decay begin to be perceived at the age of 40, and ſometimes ſooner; this is the *age of decline*. They increaſe by ſlow degrees till 60, which is the period of old age. They increaſe more rapidly till the age of 70 or 75. At this period crazineſs begins, and continues always to increaſe. Next ſucceeds decrepitude, when the memory is gone, the uſe of the ſenſes loſt, the ſtrength totally annihilated, the organs worn out, and the functions of the body almoſt deſtroyed. Little now remains to be loſt, and before the age of 90 or 100, death terminates at once decrepitude and life.

The body then dies by little and little; its motion gradually diminiſhes; life is extinguiſhed by ſucceſſive gradations, and death is only the laſt term in the ſucceſſion. When the motion of the heart, which continues longeſt, ceaſes, man has then breathed his laſt; he has paſſed from the ſtate of life to the ſtate of death; and as at his birth a breath opened to him the career of life, ſo with a breath he finiſhes his courſe.

This natural cauſe of death is common to all animals, and even to vegetables. We may obſerve that the centre of an oak firſt periſhes and falls into duſt, becauſe theſe parts having become harder and more compact, can receive no further nouriſhment. The cauſes of our diſſolution, therefore, are as neceſſary as death is inevitable; and it is no more in our power to retard this fatal term than to alter the eſtabliſhed laws of the univerſe. In whatever manner death happens, the time thereof is unknown. It is conſidered, however, as at all times terrible, and the very thoughts of it fill the mind with fear and trouble. It is notwithſtanding our duty frequently to direct our thoughts to that event, which muſt inevitably happen, and by a life of virtue and innocence to prepare againſt thoſe conſequences which we ſo much dread.

As in women the bones, the cartilages, the muſcles, and every other part of the body, are ſofter and leſs ſolid than thoſe of men, they muſt require more time in hardening to that degree which occaſions death. Women of courſe ought to live longer than men. This reaſoning is confirmed by experience; for by conſulting the bills of mortality, it appears, that after women have paſſed a certain age, they live much longer than men who have arrived at the ſame age. In like manner, it is found by experience, that in women the age of youth is ſhorter and happier than in men, but that the period of old age is longer, and attended with more trouble.

It is not our buſineſs here to conſider theſe circumſtances which are calculated to preſerve health and prolong life. Many of theſe are mentioned in the medical articles; and thoſe who wiſh to make this ſubject their particular ſtudy, [illegible] provided for them, in Sir John Sinclair's "Code of Health and Longevity."

Iſle of Man, an iſland in the Iriſh ſea, lying about ſeven leagues north from Angleſey, about the ſame diſtance weſt from Lancaſhire, nearly [illegible]

[illegible]

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* Hufeland on prolonging Life, 423.

diſtance ſouth-eaſt from Galloway, and nine leagues eaſt from Ireland. Its form is long and narrow, ſtretching from the north-eaſt of Ayre point to the Calf of Man, which lies ſouth-weſt at leaſt 30 Engliſh miles. Its breadth in ſome places is more than nine miles, in moſt places eight, and in ſome not above five; and it contains about 160 ſquare miles.

The firſt author who mentions this iſland is Cæſar; for there can be as little doubt, that, by the *Mona* of which he ſpeaks in his Commentaries, placing it in the midſt between Britain and Ireland, we are to underſtand Man; as that the *Mona* of Tacitus, which he acquaints us had a fordable ſtrait between it and the continent, can be applied only to Angleſey. Pliny has ſet down both iſlands; *Mona*, by which he intends Angleſey, and *Monabia*, which is Man. In Ptolemy we find *Monaœda*, or *Monaida*, that is, the farther or more remote Mön. Oroſius ſtyles it *Menavia;* tells us, that it was not extremely fertile; and that this, as well as Ireland, was then poſſeſſed by the Scots. Beda, who diſtinguiſhes clearly two Menavian iſlands, names this the *northern Menavia*, beſtowing the epithet of *ſouthern* upon Angleſey. In ſome copies of Nennius, this iſle is denominated *Eubonia;* in others, *Menavia;* but both are explained to mean *Man*. Alured of Beverley alſo ſpeaks of it as one of the Menavian iſlands. The Britons, in their own language, called it *Manaw*, more properly *Main au*, i. e. "a little iſland," which ſeems to be Latinized in the word *Menavia*. All which clearly proves, that this ſmall iſle was early inhabited, and as well known to the reſt of the world as either Britain or Ireland.

In the cloſe of the firſt century, the Druids, who were the prieſts, prophets, and philoſophers of the old Britons, were finally expelled by Julius Agricola from the ſouthern Mona; and we are told, that they then took ſhelter in the northern. This iſland they found well planted with firs; ſo that they had, in ſome meaſure, what they delighted in moſt, the ſhelter of trees; but, however, not the ſhelter of thoſe trees in which they moſt delighted, viz. the oaks: and therefore theſe they introduced. No hiſtories tell us this; but we learn it from more certain authority, great woods of fir having been diſcovered interred in the bowels of the earth, and here and there ſmall groves of oaks: but as theſe trees are never met with intermixed, ſo it is plain they never grew together: and as the former are by far the moſt numerous, we may preſume them the natural produce of the country, and that the latter were planted and preſerved by the Druids. They gave the people, with whom they lived, and over whom they ruled, a gentle government, wiſe laws, but withal a very ſuperſtitious religion. It is alſo very likely that they hindered them, as much as they could, from having any correſpondence with their neighbours; which is the reaſon that though the iſland is mentioned by ſo many writers, not one of them, before Oroſius, ſays a word about the inhabitants. A little before this time, that is, in the beginning of the fifth century, the Scots had tranſported themſelves thither, it is ſaid, from Ireland. The tradition of the natives of Man (for they have a traditionary hiſtory) begins at this period. They ſtyle this firſt diſcoverer *Mannan Mac Lear;* and they ſay that he was a magician, who kept this country covered with miſts, ſo that the inhabitants of other places could never find it. But the ancient chronicles of Ireland inform us, that the true name of this adventurer was *Orbſen*, the ſon of Alladius, a prince in their iſland; and that he was ſurnamed *Mannanan*, from his having firſt entered the iſland of Man, and *Mac Lir*, i. e. "the offspring of the ſea," from his great ſkill in navigation. He promoted commerce; and is ſaid to have given a good reception to St Patrick, by whom the natives were converted to Chriſtianity.

The princes who ruled after him ſeem to have been of the ſame line with the kings of Scotland, with which country they had a great intercourſe, aſſiſting its monarchs in their wars, and having the education of their princes confided to them in time of peace.

In the beginning of the ſeventh century, Edwin king of Northumberland invaded the Menavian iſlands, ravaged Man, and kept it for ſome time, when, Beda aſſures us, there were in it about 300 families; which was leſs than a third part of the people in Angleſey, though Man wants but a third of the ſize of that iſland.

The ſecond line of their princes they derive from Orri, who, they ſay, was the ſon of the king of Norway; and that there were 12 princes of this houſe who governed Man. The old conſtitution, ſettled by the Druids, while they ſwayed the ſceptre, was perfectly reſtored; the country was well cultivated and well peopled; their ſubjects were equally verſed in the exerciſe of arms and in the knowledge of the arts of peace: in a word, they had a conſiderable naval force, an extenſive commerce, and were a great nation, though inhabiting only a little iſle. Guttred the ſon of Orri built the caſtle of Ruſſyn, A. D. 960, which is a ſtrong place, a large palace, and has ſubſiſted now above 800 years. Macao was the ninth of theſe kings, and maintained an unſucceſsful ſtruggle againſt Edgar, who reduced all the little ſovereigns of the different parts of Britain to own him for their lord; and who, upon the ſubmiſſion of Macao, made him his high-admiral, by which title (*archipirata*, in the Latin of thoſe times) he ſubſcribes that monarch's charter to the abbey of Glaſtonbury.

After the death of Edward the Confeſſor, when Harold, who poſſeſſed the crown of England, had defeated the Norwegians at the battle of Stamford, there was amongſt the fugitives one Goddard Crownan, the ſon of Harold the Black, of Iceland, who took ſhelter in the iſle of Man. This iſle was then governed by another Goddard, who was a deſcendant from Macao, and he gave him a very kind and friendly reception. Goddard Crownan, during the ſhort ſtay he made in the iſland, perceived that his nameſake was univerſally hated by his ſubjects; which inſpired him with hopes that he might expel the king, and become maſter of the iſland. This he at laſt accompliſhed, after having defeated and killed Fingal the ſon of Goddard, who had ſucceeded his father. Upon this he aſſigned the north part of the iſland to the natives, and gave the ſouth to his own people; becoming, in virtue of his conqueſt, the founder of their third race of princes. However he might acquire his kingdom, he governed it with ſpirit and prudence, made war with ſucceſs in Ireland; gained ſeveral victories over the Scots in the Iſles; and, making a tour through his new-obtained dominions, deceaſed in the iſland of Iſlay. He left behind him three ſons. A civil war breaking out between the two eldeſt, and both of them deceaſing in a few years, Magnus king of Norway coming with a powerful fleet, poſſeſſed himſelf of Man and the Iſles, and held them as long as he lived: but, being ſlain in Ireland, the people invited home Olave, the youngeſt ſon of Goddard Crownan, who had fled to the court of England, and been very honourably treated by Henry the Second. There were in the whole nine princes of this race, who were all of them feudatories to the kings of England; and often reſorted to their court, were very kindly received, and had penſions beſtowed upon them. Henry III. in particular, charged Olave, king of Man, with the defence of the coaſts of England and Ireland; and granted him annually for that ſervice 40 marks, 100 meaſures of wheat, and five pieces of wine. Upon the demiſe of Magnus, the laſt king of this iſle, without heirs male, Alexander III. king of Scots, who had conquered the other iſles, ſeized likewiſe upon this; which, as parcel of that kingdom, came into the hands of Edward I. who directed William Huntercombe, guardian or warden of that iſle for him, to reſtore it to John Baliol, who had done homage to him for the kingdom of Scotland.

But it ſeems there was ſtill remaining a lady named *Auſtrica*, who claimed this ſovereignty, as couſin and neareſt of kin to the deceaſed Magnus. This claimant being able to obtain nothing from John Baliol, applied herſelf next to King Edward, as the ſuperior lord. He, upon this application, by his writ which is yet extant, commanded both parties, in order to determine their right, to appear in the king's bench. The progreſs of this ſuit does not appear; but we know farther, that this lady, by a deed of gift, conveyed her claim to Sir Simon de Montacute; and, after many diſputes, invaſions by the Scots, and other accidents, the title was examined in parliament, in the ſeventh of Edward III. and ſolemnly adjudged to William de Montacute; to whom, by letters-patent, dated the ſame year, that monarch releaſed all claim whatſoever.

In the ſucceeding reign, William Montacute, earl of Saliſbury, ſold it to Sir William Scroop, afterwards earl of Wiltſhire; and, upon his loſing his head, it was granted by Henry IV. to Henry Percy, earl of Northumberland; who, being attainted, had, by the grace of that king, all his lands reſtored, except the iſle of Man, which the ſame monarch granted to Sir John Stanley, to be held by him of the king, his heirs and ſucceſſors, by homage, and a caſt of falcons to be preſented at every coronation. Thus it was poſſeſſed by this noble family, who were created earls of Derby, till the reign of Queen Elizabeth; when, upon the demiſe of Earl Ferdinand, who left three daughters, it was, as Lord Coke tells us, adjudged to theſe ladies, and from them purchaſed by William earl of Derby, the brother of Ferdinand, from whom it was claimed by deſcent, and adjudged to the duke of Athol.

The iſland itſelf is ſituated directly in the middle of the channel, is very beneficial to Britain, by breaking the force of the tides, which would otherwiſe break with far greater violence than they do at preſent. It is frequently expoſed to very high winds, and at other times to miſts, which, however, are not at all unwholeſome. The ſoil towards the north is dry and ſandy, of conſequence unfertile, but not unimprovable; the mountains, which may include near two-thirds of the iſland, are bleak and barren; yet afford excellent peat, and contain ſeveral kinds of metals. They maintain alſo a kind of ſmall ſwine, called *purrs*, which are eſteemed excellent pork. In the valleys there is as good paſture, hay, and corn, as in any of the northern counties; and the ſouthern part of the iſland is as fine ſoil as can be wiſhed. They have marl and limeſtone ſufficient to render even their pooreſt lands fertile; excellent ſlate, ragſtone, black marble, and ſome other kinds for building. They have vegetables of all ſorts, and in the utmoſt perfection; potatoes in immenſe quantities; and, where proper pains have been taken, they have tolerable fruit. They have alſo hemp, flax, large crops of oats and barley, and ſome wheat. Hogs, ſheep, goats, black cattle, and horſes, they have in plenty; and, though ſmall in ſize, yet if the country was thoroughly and ſkilfully cultivated, they might improve the breed of all animals, as experience has ſhown. They have rabbits and hares very fat and fine; tame and wild fowl in great plenty; and in their high mountains they have one airy of eagles and two of excellent hawks. Their rivulets furniſh them with ſalmon, trout, eels, and other kinds of freſh-water fiſh; on their coaſts are caught cod, turbot, ling, holibut, all ſorts of ſhell-fiſh (oyſters only are ſcarce, but large and good), and herrings, of which they made anciently a great profit, though this fiſhery is of late much declined.

The inhabitants of Man, though far from being unmixed, were perhaps, till within the courſe of the 18th century, more ſo than any other under the dominion of the crown of Great Britain; to which they are very proud of being ſubjects, though, like the inhabitants of Jerſey and Guernſey, they have a conſtitution of their own, and a peculiarity of manners naturally reſulting from a long enjoyment of it.—The Manks tongue is the only one ſpoken by the common people. It is the old Britiſh, mingled with Norſe, or the Norwegian language, and the modern language. The clergy preach and read the common prayer in it. In ancient times they were diſtinguiſhed by their ſtature, courage, and great ſkill in maritime affairs. They are at this day a briſk, lively, hardy, induſtrious, and well-meaning people. Their frugality defends them from want: and though there are few that abound, there are as few in diſtreſs; and thoſe that are, meet with a cheerful unconſtrained relief. On the other hand, they are choleric, loquacious, and as the law till lately was cheap, and unencumbered with ſolicitors and attorneys, not a little litigious. The revenue, in the earl of Derby's time, amounted to about 2500l. a-year; from which, deducting his civil liſt, which was about 700l. the clear income amounted to 1800l. At the ſame time, the number of his ſubjects was computed at 20,000.—The ſovereignty of Man, though [illegible] the title of king, was ſtill a veſted with regal rights and prerogatives: but the diſtinct juriſdiction of this little ſubordinate royalty, being found inconvenient for the purpoſes of public juſtice and for the revenue (it affording a commodious aſylum for debtors, outlaws, and ſmugglers), authority was given to the treaſury, by ſtat. 12 Geo. I. c. 28. to purchaſe the intereſt of the then proprietors for the uſe of the crown: which purchaſe was at length completed in the year 1765, and confirmed by ſtat. 5 Geo. III. c. 26. and 39.; whereby the whole iſland and all its dependencies (except the landed property of the Athol family), their manorial rights and emoluments, and the patronage of the biſhopric and other eccleſiaſtical benefices, are unalienably veſted in the crown, and ſubjected to the regulation of the Britiſh exciſe and cuſtoms.

The moſt general diviſion of this iſland is into north and ſouth; and it contains 17 pariſhes, of which five are market towns, the reſt villages. Its diviſion with regard to its civil government, is into ſix ſheedings, every one having its proper coroner, who is in the nature of a ſheriff, is intruſted with the peace of his diſtrict, ſecures criminals, brings them to juſtice, &c. The lord chief juſtice Coke ſays, "their laws were ſuch as ſcarce to be found anywhere elſe." In July 1786, a copper coinage for the uſe of the iſland was iſſued from the Tower of London.—There is a ridge of mountains runs almoſt the length of the iſle, from whence they have abundance of good water from the rivulets and ſprings; and Snafield, the higheſt, riſes about 580 yards. The air is ſharp and cold in winter, the froſts ſhort, and the ſnow, eſpecially near the ſea, lies not long on the ground. Here are quarries of good ſtone, rocks of limeſtone and red freeſtone, and good ſlate, with ſome mines of lead, copper, and iron. The trade of this iſland was very great before the year 1726; but the late Lord Derby farming out his cuſtoms to foreigners, the inſolence of theſe farmers drew on them the reſentment of the government of England, who, by an act of parliament, deprived the inhabitants of an open trade with this kingdom. This naturally introduced a clandeſtine commerce, which they carried on with England and Ireland with prodigious ſucceſs, and an immenſe quantity of foreign goods was run into both kingdoms, till the government in 1765 thought proper to put an entire ſtop to it, by purchaſing the iſland of the duke of Athol, as already mentioned, and permitting a free trade with England. On the little iſle of Peele, on the weſt ſide of Man, is a town of the ſame name, with a fortified caſtle. Before the ſouth promontory of Man, is a little iſland called the *Calf of Man:* it is about three miles in circuit, and ſeparated from Man by a channel about two furlongs broad. At one time of the year it abounds with puffins, and alſo with a ſpecies of ducks and drakes, by the Engliſh called *barnacles*, and by the Scots *clakes* and *ſoland geeſe*.

Few men of extraordinary talents have appeared in this iſland; perhaps, becauſe few occaſions have offered for calling them forth. The Rev. J. Stowell is an exception, maſter of the free grammar-ſchool at Peele, who poſſeſſed the ſtrongeſt powers of mind, was benevolent to the poor, free from pedantry, and forcibly illuſtrated all his precepts by his example.

The women in the iſle of Man are not remarkable for elegance of form or delicacy of features. The practice of her domeſtic duties, and the regulation of her domeſtic affairs, conſtitute the employment of the Manks wife; and if not ſo refined as the dames of more poliſhed nations, ſhe is perhaps as happy.

Landed property is very much divided in the iſland, there being ſcarcely ſix men who have eſtates above 500l. a year.

The internal ſcenery of the iſle of Man is far from being beautiful, of which the chief cauſe is the want of wood; and the rivers are ſo ſmall as to add little to the richneſs of the views. The Manks are fond of dancing, and dance well. Two balls in the year are given at Caſtletown; one on the king's birth day, the other on the queen's, and there are frequent private dances. At Ramſay, during the winter of 1801, a ſociety of ladies and gentlemen was formed, which met three evenings in the week for the purpoſe of reading Shakeſpeare, and ſuch a number of copies were procured, that each character of the drama was ſupported, by a ſeparate individual.

The inhabitance of this iſle (the number of which is eſtimated at 40,000) are of the church of England; and the biſhop is ſtyle *Biſhop of Sodor and Man*. He has no vote in the Britiſh houſe of peers. This biſhoprick was firſt erected by Pope Gregory IV. and for its dioceſe had this iſle and all the Hebrides or Weſtern iſlands of Scotland; but which were called *Sodoroe* by by the Danes, who went to them by the north, from the Swediſh Sodor, Sail or Oar iſlands, from which the title of the biſhop of Sodor is ſuppoſed to originate. The biſhop's ſeat was at Ruſhin, or Caſtletown, in the iſle of Man, and in Latin is entitled *Sodorenſis*. But when this iſland became dependent upon the kingdom of England, the Weſtern iſlands withdrew themſelves from the obedience of their biſhop, and had a biſhop of their own, whom they entitled alſo *Sodorenſis*, but commonly *Biſhop of the Iſles*. The patronage of the biſhoprick was given, together with the iſland, to the Stanleys by King Edward IV. and came by an heir-female to the family of Athol, and, on a vacancy thereof, they nominated their deſigned biſhop to the king, who diſmiſſed him to the archbiſhop of York for conſecration.—By an act of parliament, the 33d of King Henry VIII. this biſhopric is declared in the province of York.

Man-of-war Bird. See PELICANUS, ORNITHOLOGY *Index*.

MANAGE. See MANEGE.

MANASSEH, in Scripture hiſtory, the eldeſt ſon of Joſeph, and grandſon of the patriarch Jacob (Gen. xli. 50, 51.) was born in the year of the world 2290, before Jeſus Chriſt 1714.

The tribe deſcended from him came out of Egypt, in number 32,200 men fit for battle, upwards of 20 years old, under the conduct of Gamaliel ſon of Pedahzur (Numb. ii. 20, 21.) This tribe was divided at their entrance into the land of Promiſe. One half had its portion beyond the river Jordan, and the other half on this ſide the river. The half tribe of Manaſſeh which ſettled beyond the river poſſeſſed the country of Baſhan, from the river Jabbok to Mount Libanus, (Numb. xxii. 33. 34. &c.); and the other half tribe of Manaſſeh on this ſide Jordan, obtained for its inheritance the country between the tribe of Ephraim to the ſouth and the tribe of Iſſachar to the north, having the river Jordan to the eaſt and the Mediterranean ſea to the weſt, (Joſh. xvi. xvii.)

MANASSEH, the 15th king of Judah, being the ſon and ſucceſſor of Hezekiah. His acts are recorded in 2 Kings xx. xxi. and 2 Chr. xxxiii.

MANATI. See TRICHECUS, MAMMALIA *Index*.

MANCA, was a ſquare piece of gold coin, commonly valued at 30 pence; and *mancuſa* was as much as a mark of ſilver, having its name from *manu cuſa*, being coined with the hand: (*Leg. Canut.*) But the *manca* and *mancuſa* were not always of that value; for ſometimes the former was valued at ſix ſhillings, and the latter, as uſed by the Engliſh Saxons, was equal in value to our half crown. Manca *ſex ſolidis æſtimetur*, (Leg. H. 1. c. 69.) Thorn in his chronicle, tells us, that mancuſa *eſt pondus duorum ſolidorum et ſex denariorum*; and with him agrees Du Cange, who ſays, that 20 *mancæ* make 50 ſhillings. *Manca* and *mancuſa* are promiſcuouſly uſed in the old books for the ſame money.

MANCHA, a territory of Spain in the province of New Caſtile, lying between the river Guadiana and Andaluſia. It is a mountainous country; and it was here that the famous Don Quixote was ſuppoſed to perform his exploits.

MANCHESTER, a town of Lancaſhire in England, ſituated in W. Long. 2. 42. N. Lat. 53. 27. Mr Whitaker conjectures, that the ſtation was firſt occupied by the Britons about 500 years B. C. but that it did not receive any thing like the form of a town till 450 years after, or 50 years B. C. when the Britons of Cheſhire made an irruption into the territories of their ſouthern neighbours, and of conſequence alarmed the Seſtuntii, or inhabitants of Lancaſhire, ſo much, that they began to build fortreſſes, in order to defend their country. Its Britiſh name was *Mancenion*, that is, "a place of tents:" it was changed, however, into *Mancunium* by the Romans, who conquered it under Agricola in the memorable year of the Chriſtian æra 79. It appears alſo to have been called *Manduefuedum*, *Manducſſedum*, *Manucium*, and *Manceſtre*; from which laſt it ſeems moſt evident that the preſent name has been derived. It is diſtant from London 182 miles, and from Edinburgh, 214; ſtanding near the conflux of the Irk and the Irwell, about three miles from the Merſey.

Mancheſter was accounted a large and populous town even 50 years ago; but ſince that time it is ſuppoſed to have increaſed in more than a triple proportion, both in reſpect to buildings and inhabitants. The houſes amount to a number not far ſhort of 12,000; and perhaps it may not be an overrate to reckon ſeven perſons to each, when it is conſidered, that, of the houſes occupied by working people of various deſcriptions, many have two, three, and ſometimes more, families in each. For though many hundred houſes have been built in the courſe of a few late years, yet are they conſtantly engaged as ſoon as poſſible; the avidity for building increaſing with every new acceſſion of inhabitants, and rents riſing to a degree ſcarcely known in other places. The progreſs of this οικομανια may be partly eſtimated by the price of building, land, and materials: a guinea per ſquare yard, chief rent, having been refuſed for ſome central plots; and bricks ſelling at 24s. per 1000, which about four years ſince were not more than half the price. Such, however, has been the happy concurrence of ingenuity and induſtry, and ſuch the aſtoniſhing improvements daily making in its numerous manufactures, together with the encouragement theſe afford to ſkilful artiſts in various branches, that ſtreets muſt extend in proportion: yet population appears to have increaſed more rapidly than buildings; hence competitions naturally ariſe, and hence a *temporary* advance of rents. The manufactures of this town and neighbourhood, from humble domeſtic beginnings about two centuries ago, have now, after progreſſive improvements, acquired ſuch celebrity, both in the ſcale of ornament and utility, as to ſpread in ten thouſand forms and colours, not only in theſe kingdoms, but over all Europe, and even into the diſtant continents; being at once moſt precious mines of well-earned private wealth, and important contributors to the neceſſary public treaſure of the ſtate. Its poſt-office alone may afford an evidence of its extenſive commerce. The population of the town may be further calculated from the great number of cotton factories within the boundaries of the town, wherein it is thought that 20,000 men, women, and children, are employed in the mere branches of preparing *warp* and *weft*. If to theſe be added the many hands applied to weaving &c. &c. &c. beſide all the more general mechanics, as well as houſeholders, domeſtic ſervants, &c. Mancheſter may be ranked as the moſt populous market-town in Great Britain. The marriages in Mancheſter and Salford, from January 1791 to January 1792, were 1302, the chriſtenings 2960, and the burials 2286. Hence, ſhould it be computed that one in every 30 perſons died, the number of inhabitants would amount to 68,580, which is thought to be much under the ſum of an actual enumeration. The ſtreets are about 600, many of them ſpacious and airy, great part of the old buildings being removed, and the new ſtreets allowed a convenient breadth. The town is lighted every night by 2000 lamps, and guarded by nearly 200 watchmen.

The college was founded in 1422 by *Thomas Weſt* Lord Delaware; and conſiſted of a warden, eight fellows, four clerks, and ſix choriſters. About the ſame time the preſent collegiate church was built (timber only having been uſed for the former church). This church is a fine ſtructure of what is termed the Gothic ſyſtem, and is much enriched with ſculpture. The collegiate body conſiſts of a warden, four fellows, two chaplains, two clerks (one of whom, by a very late regulation, is to be at leaſt bachelor of arts and in prieſt's orders), four choriſters, and four ſinging men.

Beſide the collegiate church, there are alſo the following. St Anne's, a handſome church, begun in 1709 and finiſhed in 1723: it is in the gift of the biſhop of Cheſter. St Mary's, built by the clergy of the collegiate church, and conſecrated upwards of 30 years ago, is a neat and indeed an elegant edifice; as is St John's, which was built about 20 years ſince by the late Edward Byrom, Eſq. The next preſentation thereof is, by act of parliament, veſted in his heirs, afterwards devolving to the warden and fellows of the collegiate church. St Paul's church was erected upwards of 12 years ago; and is a handſome ſpacious building, chiefly brick; to which has been added, within the laſt two years, a lofty and ſubſtantial ſtone tower. St James's

Mancheſter.

church has been finiſhed within the laſt ten years: it is a large well-lighted building of brick and ſtone, with a ſmall ſtone ſteeple. St Mark's is alſo of brick and ſtone, with a ſquare tower. It was built by the late Rev. Humphrey Owen (one of the chaplains of the collegiate church, and rector of St Mary's), in whoſe heirs the preſentation is veſted for a term of 60 years, and thenceforward in the warden and fellows of the college. To theſe may be added, St Thomas's, Ardwick Green, and Trinity church, Salford: for though the Irwell intervenes between Mancheſter and Salford, and each is governed by its reſpective conſtables; yet, being connected by three bridges, by mutual friendſhip, and by the common purſuit of univerſally uſeful manufactures and commerce, the two places are generally conſidered under the name of *Mancheſter*, as the borough of Southwark is not improperly deemed a part of the metropolis. In Salford there is likewiſe a Methodiſt chapel nearly finiſhed. A new church is alſo about to be built and dedicated to St Stephen.—In Mancheſter a new church is lately finiſhed, and called *St George's*; but divine ſervice has not yet been performed therein. St Peter's church, at the end of Moſley-ſtreet, was begun about three years ſince: when finiſhed, it will be a ſtrong and elegant ſtone ſtructure with a high ſpire; at preſent the body only is completed, and lighted, in a manner not very common, by ſix ſemicircular windows. The foundation of another church, to be called *St Clement's*, has alſo been laid, within the preſent year 1792, in Stephenſon's ſquare lately planned; and alſo one called the *New Jeruſalem Church*, nearly finiſhed. Beſides the 14 churches above enumerated, there are, a Catholic chapel, a large Methodiſt chapel, a chapel for the people called Quakers, and 5 chapels for diſſenters of other denominations.

Cheetham's Hoſpital, commonly called the College, becauſe it was originally the place of reſidence of the warden and fellows, is deſerving of particular notice. Humphrey Cheetham of Clayton near Mancheſter, Eſq; having been remarkably ſucceſsful in trade in the middle of the laſt century, bought the college, and liberally endowed it for the maintenance and education of 40 poor boys, admiſſible between the age of 6 and 10 years. By an improvement of the funds of the charity, the numbers of boys was increaſed to 60; and continued ſuch till the Eaſter meeting of the feoffees in 1780, when another augmentation took place, and the number has ſince been conſtantly 80. The townſhips, pointed out by the founder for objects of his charity, are the following, together with the reſpective numbers admitted from each: Mancheſter, original number 14, now 28; Salford 6, now 12; Droylſden 3, now 6; Crumpſall 2, now 4; Bolton le moors 10, now 20; Turton 5, now 10. So that 89 perſons are now annually provided for by this liberal benefactor; including for the hoſpital a governor, one man and five women ſervants, a ſchool-maſter; and, on the library eſtabliſhment, a librarian. (See an authentic letter in the *Gent. Mag.* for June 1792, p. 521.) The boys of this hoſpital are comfortably provided for till the age of 14, when they are further clothed, and with a premium placed apprentices to uſeful trades; and, in order to incite early habits of induſtry, to make them good ſervants, and at length good maſters, it has been ſuggeſted to furniſh ſome kind of eaſy employment for a ſmall part of their time not engaged at ſchool. The Library, which occupies an extenſive gallery of the ſame building, owes its foundation and increaſing importance to the ſame benevolent ſource. The annual value of the fund originally bequeathed for the purchaſe of books and for a librarian's ſalary was 116l.; but by recent improvements of the eſtate, the income is more than thrice that ſum. The books at this time amount to 10,000 volumes, of which a catalogue handſomely printed in 2 volumes 8vo has been publiſhed by the preſent librarian, the Rev. John Radcliffe, A.M. At ſtated hours on all days, except Sundays and other holidays, the ſtudious may have free acceſs to read, *in the library*, any book it contains; and in order to render it comfortable during the cold ſeaſon of the year, ſeveral ſtoves are kept heated at the reading hours. This college and a large incloſed area are ſituated upon a high perpendicular rock, bounded by the Irk cloſe to its confluence with the Irwell; and is thought by Mr Whitaker to be included, as well as the collegiate church, within the boundaries of the ancient Roman prætorium; the whole of which ſite towards the Irwell, as on the ſide of the Irk, is conſiderably elevated above the water and the oppoſite land of Salford. The free-ſchool, higher up on the ſame ſide of the Irk, almoſt joining to the college, is ſupported by the rents of three mills; one of which is for grinding malt, another for corn, and the third is employed as a ſnuff mill. Theſe rents are now increaſed to 700l. *per annum*, from which ſalaries are paid to three maſters and two aſſiſtants. The ſcholars educated here have certain exhibitions allowed at the univerſity; and ſuch of them as are entered at Brazen-noſe college Oxford have a chance of obtaining ſome valuable exhibitions ariſing from lands in Mancheſter bequeathed by Mr Hulme. The deſerved reputation of this ſchool is a powerful recommendation of its ſcholars entering at the univerſities. The Academy is a large and commodious building, raiſed by the ſubſcriptions of ſeveral reſpectable diſſenters, and placed under the care of able tutors. Here youth above 14 years of age are admitted and inſtructed in the various branches of liberal knowledge, preparatory to trade or the profeſſions. The Literary and Philoſophical Society of Mancheſter was inſtituted in the beginning of the year 1781, and is well known by its Memoirs, of which three volumes 8vo have been publiſhed; theſe have been tranſlated into the German language. A fourth volume is now in the preſs, and in all probability will be publiſhed in the ſpring of 1793. A ſociety was eſtabliſhed here in November 1789, under the name of the *Lancaſhire Humane Society*, for the encouragement of all who may attempt the recovery of perſons apparently drowned. The Infirmary, Diſpenſary, Lunatic Aſylum, and public Baths, are all ſituated on one large airy plot of land, in the moſt elevated and agreeable part of the town; a pleaſant graſs-plot and gravel-walk extending the whole length of the buildings; a canal intervening between them and the public ſtreet, next to which it is guarded by iron paliſades. The Lying-in hoſpital is ſituated in Salford, at the end of the old bridge. A new Work-houſe is nearly completed; and for ſuch a purpoſe a happier ſpot could not be found

Manchester. in any town than that whereon it is erected, being on an equal eminence with the college on the opposite ſide of the Irk, and promiſing the greateſt poſſible comforts to ſuch as may be neceſſitated to become its inhabitants. The Exchange was a ſtrong good building: but ſince the late act of parliament obtained for farther improvements of the town, it has been ſold and taken down, and its ſite formed into a convenient area, to the great advantage of the ſurrounding houſes. The Theatre is a neat building, wherein the boxes are placed in a ſemicircle oppoſite to the ſtage. The Gentlemen's Concert-room is an elegant building, capacious enough to accommodate 1200 perſons. The concerts are ſupported by annual ſubſcriptions: but ſtrangers and military gentlemen have free admiſſion to the private concerts; as alſo to the public concerts, with a ſubſcriber's ticket. The new Aſſembly-rooms are large and commodious. A Circus is almoſt finiſhed. Here are two Market-places, the old and the new; which are well ſupplied with every thing in ſeaſon, though at high rates. There are ſeveral charity-ſchools belonging to different churches and chapels, where children are furniſhed with clothes and taught to read. The Sunday-ſchools are numerous, and afford inſtruction to upwards of 5000 children.

Over the Irwell are three bridges, uniting the town with Salford: the old bridge is very high at the Mancheſter end, whence it ſlopes into Salford. The middle bridge, four feet wide, raiſed upon timber and flagged, is only for the accommodation of foot-paſſengers, who from the Mancheſter ſide muſt deſcend to it by nearly forty ſteps. The lower bridge is a handſome ſtone building of two arches; this bridge affords a level road for two or three carriages abreaſt. It was undertaken and finiſhed by the private ſubſcription of a few gentlemen; and a ſmall toll is taken for all paſſing, which toll is now annually let by auction, and pays the proprietors remarkably well.—From Mancheſter there are likewiſe the ſame number of bridges over the Irk; only one, however, is adapted for the paſſage of carriages. The Irwell, having at a great expence been rendered navigable for veſſels of 20 or 30 tons burden, there is a conſtant communication between Liverpool, Mancheſter, and the intermediate places on the Irwell and Merſey, to the great advantage of the proprietors and the country at large. This navigation, and more eſpecially the duke of Bridgewater's canal, opening a paſſage from Mancheſter to the Merſey at 30 miles diſtance, have, together, greatly contributed to the preſent highly flouriſhing ſtate of the town. Advantages ſtill greater, becauſe more widely diffuſive, may reſult from the intended union of the Humber and the Merſey by means of canals. Indeed, every mile of canal would benefit many miles of land; and ſuch would be the reciprocity of intereſt, that it would undoubtedly extend and be felt far beyond the viſible meaſurement of the navigation."

The News Room and Library in Mancheſter is an elegant building, and an ornament to the town; and as it comprehends in it a news room, circulating library, and reading room, muſt be productive of general utility. The propoſal of this inſtitution met with much oppoſition at firſt; but it was finally carried by the unwearied exertions of a Mr [illegible], a man whoſe character was univerſally loved and admired. Mancheſter.

We muſt not omit to notice the new penitentiary-houſe, called the *New Bailey*, for ſeparate confinement of various criminals. Over the entrance is a large ſeſſion room, with adjoining rooms for the magiſtrates, council, jurors, &c. Beyond this, in the centre of a very large area incloſed by very high walls, ſtands the Priſon, an excellent building, in form of a croſs, three ſtories high; and the four wards of each ſtory may in an inſtant be ſeen by any perſon in its centre. This priſon is kept ſurpriſingly neat and healthy; and ſuch as can work at any trade, and are not confined for crimes of the greateſt magnitude, are employed in a variety of branches; ſo that one may be ſeen beating and cleanſing cotton, another carding it, another roving, and a fourth ſpinning. In the next place may be obſerved a man or a woman buſy at the loom; and in another, one or more engaged in cutting and raiſing the velvet pile. Hence induſtry is not ſuffered to ſlumber in the ſolitary cell, nor to quit it under the acquired impreſſions of that torpor which formerly accompanied the emancipated priſoner from his dungeon; rendering him, perhaps, totally unfit for the duties of honeſt ſociety, though well qualified, in all probability, to herd with gamblers, and be then, if not before, initiated into their pernicious myſteries.—At Kerſal-moor, three miles diſtant, horſe-races are annually permitted. The banks of the rivers and various brooks about the town afford excellent ſituations for the numerous dye-houſes employed for a multitude of fabrics. Among other things, the manufacture and finiſhing of hats is carried on to an extent of great importance.—The general market is here on Saturdays. Tueſday's market is chiefly for tranſacting buſineſs between the traders and manufacturers of the town and circumjacent country. The fairs are on Whit-Monday, October 1ſt, and November 17th.

Mancheſter is a manor with courts leet and baron. It ſends no members to parliament, but gives title to a duke. The annual fall of rain is here about 42 inches; though from January 1791 to January 1792 it was 44 inches. The ſun's greateſt heat in 1791 was 76°, July 17.

MANCHINEEL. See HIPPOMANE, BOTANY *Index.*

MANCIPATIO, was a term made uſe of in the Roman law, and may be thus explained; every father had ſuch a regal authority over his ſon, that before the ſon could be releaſed from his ſubjection and made free, he muſt be three times over ſold and bought, his natural father being the vender. The vendee was called *pater fiduciarius*. After this fictitious bargain, the *pater fiduciarius* ſold him again to the natural father, who could then, but not till then, *manumit* or make him free. The imaginary ſale was called *mancipatio;* and the act of giving liberty or ſetting him free after this was called *emancipatio*.

MANCIPATIO alſo ſignifies the ſelling or alienating of certain lands by the balance, or money paid by weight, and five witneſſes. This mode of alienation took place only amongſt Roman citizens, and that only in reſpect to certain eſtates ſituated in Italy, which were called *mancipi*.

MANCIPLE (*manceps*), a clerk of the kitchen, or caterer. An officer in the inner temple was anciently ſo called, who is now the ſteward there; of whom Chaucer, the ancient Engliſh poet, ſome time a ſtudent of that houſe, thus writes:

> A manciple there was within the temple,
> Of which all caterers might take enſample.

This officer ſtill remains in colleges in the univerſities.

MANCUNIUM, in *Ancient Geography*, a town of the Brigantines in Britain. Now *Mancheſter* in Lancaſhire. See MANCHESTER.

MANCUS (formed of *manu cuſus*), in antiquity, an Anglo-Saxon gold coin, equal in value to $2\frac{1}{2}$ ſolidi, or 30 pence; and in weight to 55 Troy grains. The firſt account of this coin that occurs in the hiſtory of our country, is about the cloſe of the 8th century, in an embaſſy of Cenwulf king of Mercia to Leo III. requeſting the reſtoration of the juriſdiction of the ſee of Canterbury: this embaſſy was enforced by a preſent of 120 mancuſes. Ethelwolf alſo ſent yearly to Rome 300 mancuſes: and theſe coins are ſaid to have continued in ſome form or other till towards the concluſion of the Saxon government. The heriots of the nobility are chiefly eſtimated by this ſtandard in Canute's laws. It came originally from Italy, where it was called *ducat*: and is ſuppoſed to have been the ſame with the drachma or miliarenſis current in the Byzantine empire.

MANDAMUS, in *Law*, a writ that iſſues out of the court of king's-bench, ſent to a corporation, commanding them to admit or reſtore a perſon to his office. This writ alſo lies where juſtices of the peace refuſe to admit a perſon to take the oaths in order to qualify himſelf for enjoying any poſt or office; or where a biſhop or archdeacon refuſes to grant a probate of a will, to admit an executor to prove it, or to ſwear a church-warden, &c.

MANDANES, an Indian prince and philoſopher, who for the renown of his wiſdom was invited by the ambaſſadors of Alexander the Great to the banquet of the ſon of Jupiter. A reward was promiſed him if he obeyed, but he was threatened with puniſhment in caſe of a refuſal. Unmoved by promiſes and threatenings, the philoſopher diſmiſſed them with obſerving, that though Alexander ruled over a great part of the univerſe, he was not the ſon of Jupiter; and that he gave himſelf no trouble about the preſents of a man who poſſeſſed not wherewithal to content himſelf. "I deſpiſe his threats (added he): if I live, India is ſufficient for my ſubſiſtence; and to me death has no terrors, for it will only be an exchange of old age and infirmity for the happineſs of a better life."

MANDARINS, a name given to the magiſtrates and governors of provinces in China, who are choſen out of the moſt learned men, and whoſe government is always at a great diſtance from the place of their birth. *Mandarin* is alſo a name given by the Chineſe to the learned language of the country; for beſides the language peculiar to every province, there is one common to all the learned in the empire, which is in China what Latin is in Europe; this is called the *mandarin tongue*, or the *language of the court*.

MANDATE, in *Law*, a judicial commandment to do ſomething. See the article MANDAMUS.

MANDATE, in the canon law, a reſcript of the pope commanding an ordinary collator to put the perſon therein named in poſſeſſion of the firſt vacant benefice in his collation.

MANDATUM, was a fee or retainer given by the Romans to the ***procuratores*** and ***advocati***. The ***mandatum*** was a neceſſary condition, without which they had not the liberty of pleading. Thus the legal eloquence of Rome, like that of our own country, could not be unlocked without a golden key.

MANDERSCHEIT, a town of Germany in the circle of the Lower Rhine, and in the electorate of Triers, capital of a county of the ſame name, between the dioceſe of Triers and the duchy of Juliers. E. Long. 6. 32. N. Lat. 50. 20.

MANDEVILLE, SIR JOHN, a phyſician, celebrated on account of his travels, was born at St Alban's, about the beginning of the 14th century. He had a liberal education, and applied himſelf to the ſtudy of phyſic; but being at length ſeized with an invincible deſire of ſeeing diſtant parts of the globe, he left England in 1332, and did not return till 34 years after. His friends, who had long ſuppoſed him dead, did not know him when he appeared. He had travelled through almoſt all the eaſt, and made himſelf maſter of a great variety of languages. He particularly viſited Scythia, Armenia the Greater and Leſs, Egypt, Arabia, Syria, Media, Meſopotamia, Perſia, Chaldea, Greece, Dalmatia, &c. His rambling diſpoſition did not ſuffer him to reſt; for he left his own country a ſecond time, and died at Liege in the Netherlands in 1732. He wrote An Itinerary, or an Account of his Travels, in Engliſh, French, and Latin.

MANDEVILLE, *Bernard de*, an eminent writer in the 18th century, was born in Holland, where he ſtudied phyſic, and took the degree of doctor in that faculty. He afterwards came over into England, and in 1714 publiſhed a poem, entitled "The Grumbling Hive, or Knaves turned Honeſt;" upon which he afterwards wrote remarks, and publiſhed the whole at London, 1723, in 8vo, under the title of "The Fable of the Bees, or private Vices made public Benefits; with an Eſſay on Charity and Charity-ſchools, and a Search into the Nature of Society." This book was preſented by the jury of Middleſex in July the ſame year, and ſeverely animadverted upon in "A Letter to the Right Honourable Lord C." printed in the London Journal of Saturday July 27. 1723. Our author publiſhed a Vindication. His book was attacked by ſeveral writers. He publiſhed other pieces, and died in 1724.

MANDING, a large ſtate in the interior of Africa, ſituated in N. Lat. 12. 40. and W. Long. 6. 40. The government, according to Mr Park, ſeems to be a kind of republic, or rather an oligarchy. Many ſpecies of edible roots are found here; but the ſugar cane, coffee, and the cocoa tree, appear to be unknown to the inhabitants. The Mandingoes are reputed a very gentle race of people, cheerful in their diſpoſitions, inquiſitive, credulous, ſimple, and fond of flattery. The men, in general, are about the middle ſize, well-ſhaped, ſtrong, and capable of enduring great labour; the women are good-natured, ſprightly, and agreeable. Both ſexes dreſs in cotton cloth of their own manufacture, and both ſeem irreſiſtibly inclined to commit depredations on the property of unprotected ſtrangers; yet, ſtrange as it may appear, they will contribute to the perſonal ſafety of the very people whom they are bent upon plundering.

Parental and filial affection is very ſtrong between the mother and her child, but not ſo between the father and his children, which muſt originate from that divided love which never fails to be an attendant on polygamy. The care of the mother extends to the cultivation of the mind; and one of the firſt leſſons in which they inſtruct their offspring, is the *practice of truth.* To ſuckle their children three years is an ordinary occurrence, during which time the huſband devotes all his attention to his other wives. When a young man intends to marry a young girl, he firſt addreſſes the parents, as her conſent is not deemed neceſſary. If the parents are agreeable, ſhe muſt either accept of the hand of her lover, or continue unmarried all her life long. The Mandingoes practiſe circumciſion both on males and females, which is a very painful operation, but not performed by them from any religious motive, for they have a ſuperſtitious notion that it contributes to render the married ſtate prolific. Mr Park aſſures us, that the belief of one God, and a future ſtate of rewards and puniſhments, is univerſal among them, but that the management of all ſublunary concerns is committed to certain ſubordinate or tutelary agents, whoſe wrath they deprecate by every mean in their power. Theſe people ſeldom arrive at old age, being grayheaded and covered with wrinkles about 40, and few reach the age of 60, although their diſeaſes are few, being confined almoſt to fevers, fluxes, elephantiaſis, and a leproſy of the worſt kind, together with the *Guinea worm.* Their feelings, on the death of a relation, are manifeſted by loud and diſmal howlings; and the body is interred, when rolled up in white cotton with a mat above it, on the day of its deceaſe. The men cultivate the ground, and the women manufacture cotton cloth, viz. the ſpinning and dyeing of it, for it is wove by the men in looms of about four inches broad. Here alſo there are manufactories of leather and iron. They tan and dreſs leather with great expedition, and are ſaid to be acquainted with the ſmelting of gold, which they convert into a great variety of ornaments, executed with much taſte and ingenuity.

Their notions of geography are rather puerile, as they conceive the earth to be an extended plane, the termination of which no eye has as yet diſcovered, it being, according to them, overhung with clouds and darkneſs. They ſuppoſe the ſea to be a large river of ſalt water, on the farther ſhore of which is ſituated a country called *Tobaubodoo*, or the land of the white people; at a diſtance from which they deſcribe another country, which they believe to be inhabited by cannibals of a gigantic ſize, called *Koomi.*

As to their ideas of property, they conſider the lands in native woods to belong to government. When any individual of free condition has the means of cultivating more land than he actually poſſeſſes, he applies to the chief man of the diſtrict, who allows him an extenſion of territory, on condition of forfeiture, if the lands are not brought into cultivation by a given period. The condition being fulfilled, the ſoil becomes veſted in the poſſeſſor, and in all probability deſcends to his heirs.

MANDRAGORA. See ATROPA, BOTANY *Index.*

MANDRAKE. See ATROPA and MUSA, BOTANY *Index.*

MANDREL, a kind of wooden pulley, making a member of the turner's lathe. Of theſe there are ſeveral kinds; as *Flat Mandrels*, which have three or more little pegs or points near the verge, and are uſed for turning flat boards on. *Pin Mandrels*, which have a long wooden ſhank to fit into a round hole made in the work to be turned. *Hollow Mandrels*, which are hollow of themſelves, and uſed for turning hollow work. *Screw Mandrels*, for turning ſcrews, &c.

MANE, the hair hanging down from a horſe's neck; which ſhould be long, thin, and fine: and if frizzled, ſo much the better.

MANEGE, or MANAGE, the exerciſe of riding the great horſe; or the ground ſet apart for that purpoſe; which is ſometimes covered, for continuing the exerciſe in bad weather; and ſometimes open, in order to give more liberty and freedom both to the horſeman and horſe. See HORSEMANSHIP.

The word is borrowed from the French *manage*, and that from the Italian *maneggio;* or, as ſome will have it, *à manu agendo*, "acting with the hand."

MANES, a poetical term, ſignifying the ſhades or ſouls of the deceaſed. The heathens uſed a variety of ceremonies and ſacrifices to appeaſe the manes of thoſe who were deprived of burial. See LEMURES and LEMURIA.

Dii MANES, were the ſame with *inferi*, or the infernal gods, who tormented men; and to theſe the heathens offered ſacrifices to aſſuage their indignation.

The heathen theology is a little obſcure with regard to theſe gods manes. Some hold, that they were the ſouls of the dead; others, that they were the genii of men; which laſt opinion ſuits beſt with the etymology of the word.

The heathens, it is pretty evident, uſed the word *manes* in ſeveral ſenſes; ſo that it ſometimes ſignified the ghoſts of the departed, and ſometimes the infernal or ſubterraneous deities, and in general all divinities that preſided over tombs.

The invocation of the manes of the dead ſeems to have been very frequent among the Theſſalians; but it was expreſsly prohibited by the Romans. See LARES.

MANES the founder of the Manichean ſyſtem. See MANICHEES.

MANETHO, an ancient Egyptian hiſtorian, who pretended to take all his accounts from the ſacred inſcriptions on the pillars of Hermes Triſmegiſtus. He was high prieſt of Heliopolis in the time of Ptolemy Philadelphus, at whoſe requeſt he wrote his hiſtory in Greek; beginning from their gods, and continuing it down to near the time of Darius Codomannus who was conquered by Alexander the Great. His hiſtory of Egypt is a celebrated work, that is often quoted by Joſephus and other ancient authors. Julius Africanus gave an abridgement of it in his Chronology. Manetho's work is however loſt; and there only remains some fragments extracted from Julius Africanus, which are to be found in Eusebius's Chronicon.

MANFREDONIA, a port town of Naples, on the gulf of Venice, which occupies the place of the ancient Sipontum, (see the article SIPONTUM). It received its name from its founder *Manfred*; he transplanted hither the few inhabitants that remained at Sipontum, and attracted other settlers to it by various privileges and exemptions. In order to found it under the most favourable auſpices, he called together all the famous professors of astrology (a ſcience in which both he and his father placed great confidence), and caused them to calculate the happiest hour and moment for laying the first stone. He himſelf drew the plans, traced the walls and streets, ſuperintended the works, and by his presence and largeſſes animated the workmen to finiſh them in a very ſhort ſpace of time. The port was ſecured from ſtorms by a pier; the ramparts were built of the most ſolid materials; and in the great tower was placed a bell of ſo conſiderable a volume as to be heard over all the plain of Capitanata, in order to alarm the country in case of an invasion. Charles of Anjou afterwards removed the bell to Barri, and offered it at the ſhrine of St Nicholas, as a thankſgiving for the recovery of one of his children. In ſpite of all the precautions taken by Manfred to ſecure a brilliant deſtiny to his new city, neither his pains, nor the horoſcopes of his wizards, have been able to render it opulent or powerful. At preſent, Mr Swinburne informs us, it ſcarce muſters 6000 inhabitants, though moſt of the corn exported from the province is ſhipped off here, and a direct trade carried on with Venice and Greece, for which reaſon there is a lazaretto eſtabliſhed; but from ſome late inſtances we may gather, that if the kingdom of Naples has for many years paſt remained free from the plague, it is more owing to good luck, and the very trifling communication with Turkey, than to the vigilance or incorruptibility of the officers of this port. In 1620, the Turks landed and pillaged Manfredonia. All ſorts of vegetables abound here, for flavour and ſucculency infinitely ſuperior to thoſe raiſed by continual waterings in the cineritious ſoil of Naples. Lettuce in particular is delicious, and fiſh plentiful and cheap.

MANGANESE, or MAGNESIA NIGRA, a metallic ſubſtance, the oxide of which has been long known by the name of glaſs-makers ſoap, from its property of rendering glaſs colourleſs. See CHEMISTRY and MINERALOGY *Index*.

MANGE, in dogs. See FARRIERY *Index*.

MANGE. See FARRIERY, N° 339.

MANGEART, DOM THOMAS, a Benedictine of the congregation of St Vanne and St Hidulphe, whoſe knowledge was an ornament to his order. It gained him alſo the titles of antiquarian, librarian, and counſellor, to Charles duke of Lorrain. He was preparing a very conſiderable work when he died, A. D. 1763. Since his death the laſt hand was put to his book, which was publiſhed by Abbé Jacquin. This production appeared in 1763, in folio, with this title: *Introduction à la ſcience des Medailles, pour ſervir à la connoiſſance des Dieux, de la Religion, des Sciences, des Arts, et de tout ce qui appartient à l'Hiſtoire ancienne, avec les preuves tirées des Medailles.* The elementary treatiſes on the numiſmatic ſcience were not ſufficiently extenſive, and the particular diſſertations were by far too tedious and prolix. This learned Benedictine has collected into a ſingle volume all the principles contained in the former, and all the ideas of any conſequence which are to be found ſcattered through the latter. His work may ſerve as a ſupplement to Montfaucon's *Antiquity explained*. From Mangeart we likewiſe have a volume of ſermons; and a treatiſe on Purgatory; Nancy, 1730. 2 vols 12mo.

Mangel-wurzel ‖ Mania.

MANGEL WURZEL. See BETA, BOTANY *Index*; and AGRICULTURE *Index*.

MANGER, is a raiſed trough under the rack in the ſtall, made for receiving the grain or corn that a horſe eats.

MANGER, a ſmall apartment, extending athwart the lower deck of a ſhip of war, immediately within the hauſe-holes, and fenced on the after part by a partition, which ſeparates it from the other part of the deck behind it. This partition ſerves as a fence to interrupt the paſſage of the water, which occaſionally guſhes in at the hauſe-holes, or falls from the wet cable whilſt it is heaved in by the capſtern. The water, thus prevented from running aft, is immediately returned into the ſea by ſeveral ſmall channels, called *ſcuppers*, cut through the ſhip's ſide within the manger. The manger is therefore particularly uſeful in giving a contrary direction to the water that enters at the hauſe-holes, which would otherwiſe run aft in great ſtreams upon the lower deck, and render it extremely wet and uncomfortable, particularly in tempeſtuous weather, to the men who meſs and ſleep in different parts thereof.

MANGET, JOHN-JAMES, an eminent phyſician, born at Geneva in 1652. The elector of Brandenburg made him his firſt phyſician in 1699; in which poſt he continued till his death, which happened at Geneva in 1742. He wrote many works; the moſt known of which are, 1. A collection of ſeveral Pharmacopœias, in folio. 2. *Bibliotheca Pharmaceutico-medica.* 3. *Bibliotheca Anatomica.* 4. *Bibliotheca Chemica.* 5. *Bibliotheca Chirurgica.* 6. A *Bibliotheca* of all the authors who have written on medicine, in 4 vols folio. All theſe works are in Latin. Daniel le Clerc, the author of a Hiſtory of Phyſic, aſſiſted him in writing them.

MANGIFERA, the MANGO-TREE; a genus of plants belonging to the pentandria claſs; and in the natural method ranking with thoſe of which the order is doubtful. See BOTANY *Index*.

MANGLE, a machine for ſmoothing linen. See MECHANICS *Index*.

MANGOSTAN, or MANGOSTEEN. See GARCINIA, BOTANY *Index*.

MANGROVE. See RHIZOPHORA, BOTANY *Index*.

MANHEIM, a town of Germany, in the Lower Palatinate, with a very ſtrong citadel, and a palace, where the elector Palatine often reſides. It is ſeated at the confluence of the rivers Neckar and Rhine, in E. Long. 8. 33. N. Lat. 49. 25. It ſurrendered to the French in September 1795; but it was retaken by the Austrians in November following.

MANHOOD, that ſtage of life which ſucceeds puberty or adoleſcence. See MAN.

MANIA, or MADNESS. See MEDICINE *Index*.

MANICHEES, or MANICHEANS (*Manichæi*), a ſect of ancient heretics, who aſſerted two principles; ſo called from their author *Manes* or *Manichæus*, a Perſian by nation, and educated among the Magi, being himſelf one of that number before he embraced Chriſtianity.

This hereſy had its firſt riſe about the year 277, and ſpread itſelf principally in Arabia, Egypt, and Africa. St Epiphanius, who treats of it at large, obſerves that the true name of this hereſiarch was Cubricus; and that he changed it for *Manes*, which in the Perſian or Babyloniſh language ſignifies *veſſel*. A rich widow, whoſe ſervant he had been, dying without iſſue, left him ſtore of wealth; after which he aſſumed the title of the *apoſtle or envoy of Jeſus Chriſt*.

Manes was not contented with the quality of apoſtle of Jeſus Chriſt, but he alſo aſſumed that of the Paraclete, whom Chriſt had promiſed to ſend: which Auguſtine explains, by ſaying that Manes endeavoured to perſuade men, that the Holy Ghoſt did perſonally dwell in him with full authority. He left ſeveral diſciples, and among others, Addas, Thomas, and Hermas. Theſe he ſent in his lifetime into ſeveral provinces to preach his doctrine. Manes, having undertaken to cure the king of Perſia's ſon, and not ſucceeding, was put in priſon upon the young prince's death, whence he made his eſcape; but he was apprehended ſoon after, and flayed alive.

However, the oriental writers, cited by D'Herbelot and Hyde, tells us, that Manes, after having been protected in a ſingular manner by Hormizdas, who ſucceeded Sapor in the Perſian throne, but who was not able to defend him, at length, againſt the united hatred of the Chriſtians, the Magi, the Jews, and the Pagans, was ſhut up in a ſtrong caſtle, to ſerve him as a refuge againſt thoſe who perſecuted him on account of his doctrine. They add, that after the death of Hormizdas, Varanes I. his ſucceſſor, firſt protected Manes, but afterwards gave him up to the fury of the Magi, whoſe reſentment againſt him was due to his having adopted the Sadducean principles, as ſome ſay; while others attribute it to his having mingled the tenets of the Magi with the doctrines of Chriſtianity. However, it is certain that the Manicheans celebrated the day of their maſter's death. It has been a ſubject of much controverſy whether Manes was an impoſtor. The learned Dr Lardner has examined the arguments on both ſides; and though he does not chooſe to deny that he was an impoſtor, he does not diſcern evident proofs of it. He acknowledges, that he was an arrogant philoſopher and a great ſchemiſt; but whether he was an impoſtor, he cannot certainly ſay. He was much too fond of philoſophical notions, which he endeavoured to bring into religion, for which he is to be blamed: nevertheleſs, he obſerves, that every bold dogmatizer is not an impoſtor.

The doctrine of Manes was a motley mixture of the tenets of Chriſtianity with the ancient philoſophy of the Perſians, in which he had been inſtructed during his youth. He combined theſe two ſyſtems, and applied and accommodated to Jeſus Chriſt the characters and actions which the Perſians attributed to the god Mithras.

He eſtabliſhed two principles, viz. a good and an evil one: the firſt a moſt pure and ſubtile matter, which he called *light*, did nothing but good; and the ſecond, a groſs and corrupt ſubſtance, which he called *darkneſs*, nothing but evil. This philoſophy is very ancient; and Plutarch treats of it at large in his Iſis and Oſiris.

Manes borrowed many things from the ancient Gnoſtics; on which account many authors conſider the Manicheans as a branch of the Gnoſtics.

In truth, the Manichean doctrine was a ſyſtem of philoſophy rather than of religion. They made uſe of amulets, in imitation of the Baſilidians; and are ſaid to have made profeſſion of aſtronomy and aſtrology. They denied that Jeſus Chriſt, who was only God, aſſumed a true human body, and maintained it was only imaginary; and therefore they denied his incarnation, death, &c. They pretended that the law of Moſes did not come from God, or the good principle, but from the evil one; and that for this reaſon it was abrogated. They rejected almoſt all the ſacred books in which Chriſtians look for the ſublime truths of their holy religion. They affirmed, that the Old Teſtament was not the work of God, but of the prince of darkneſs, who was ſubſtituted by the Jews in the place of the true God. They abſtained entirely from eating the fleſh of any animal; following herein the doctrine of the ancient Pythagoreans; they alſo condemned marriage. The reſt of their errors may be ſeen in St Epiphanius and St Auguſtine; which laſt, having been of their ſect, may be preſumed to have been thoroughly acquainted with them.

Though the Manichees profeſſed to receive the books of the New Teſtament, yet in effect they only took ſo much of them as ſuited with their own opinions. They firſt formed to themſelves a certain idea or ſcheme of Chriſtianity; and to this adjuſted the writings of the apoſtles, pretending that whatever was inconſiſtent with this had been foiſted into the New Teſtament by later writers, who were half Jews. On the other hand, they made fables and apocryphal books paſs for apoſtolical writings; and even are ſuſpected to have forged ſeveral others, the better to maintain their errors. St Epiphanius gives a catalogue of ſeveral pieces publiſhed by Manes, and adds extracts out of ſome of them. Theſe are the Myſteries, Chapters, Goſpel, and Treaſury.

The rule of life and manners which Manes preſcribed to his followers was moſt extravagantly rigorous and ſevere. However, he divided his diſciples into two claſſes; one of which comprehended the perfect Chriſtians, under the name of the *elect*; and the other the imperfect and feeble, under the title of *auditors* or *hearers*. The elect were obliged to a rigorous and entire abſtinence from fleſh, eggs, milk, fiſh, wine, all intoxicating drink, wedlock, and all amorous gratifications; and to live in a ſtate of the ſevereſt penury, nouriſhing their emaciated bodies with bread, herbs, pulſe, and melons, and depriving themſelves of all the comforts that ariſe from the moderate indulgence of natural paſſions, and alſo from a variety of innocent and agreeable purſuits. The auditors were allowed to poſſeſs houſes, lands, and wealth, to feed on fleſh, to enter into the bonds of conjugal tenderneſs; but this liberty was granted them with many limitations, and under the ſtricteſt conditions of moderation and temperance. The general aſſembly of the Manicheans was headed by a preſident, Manichees ‖ Manilla.

preſident, who repreſented Jeſus Chriſt. There were joined to him 12 rulers or maſters, who were deſigned to repreſent the 12 apoſtles, and theſe were followed by 72 biſhops, the images of the 72 diſciples of our Lord. Theſe biſhops had preſbyters or deacons under them, and all the members of theſe religious orders were choſen out of the claſs of the elect. Their worſhip was ſimple and plain; and conſiſted of prayers, reading the ſcriptures, and hearing public diſcourſes, at which both the auditors and elect were allowed to be preſent. They alſo obſerved the Chriſtian appointment of baptiſm and the euchariſt. They kept the Lord's day, obſerving it as a faſt; and they likewiſe kept Eaſter and Pentecoſt.

Towards the 4th century, the Manicheans concealed themſelves under various names, which they ſucceſſively adopted, and changed in proportion as they were diſcovered by them. Thus they aſſumed the names of Encratites, Apotactics, Saccophori, Hydroparaſtates, Solitaries, and ſeveral others, under which they lay concealed for a certain time, but could not however long eſcape the vigilance of their enemies. About the cloſe of the 6th century, this ſect gained a very conſiderable influence, particularly among the Perſians.

Toward the middle of the 12th century, the ſect of Manichees took a new face, on occaſion of one Conſtantine, an Armenian, and an adherer to it; who took upon him to ſuppreſs the reading of all other books beſides the Evangeliſts and the Epiſtles of St Paul, which he explained in ſuch a manner as to make them contain a new ſyſtem of Manicheiſm. He entirely diſcarded all the writings of his predeceſſors; rejecting the chimeras of the Valentinians, and their 30 æons; the fable of Manes, with regard to the origin of rain, and other dreams; but ſtill retained the impurities of Baſilides. In this manner he reformed Manicheiſm, inſomuch that his followers made no ſcruple of anathematizing Scythian, Buddas, called alſo *Addas* and *Terebinth*, the contemporaries and diſciples, as ſome ſay, and, according to others, the predeceſſors and maſters of Manes, and even Manes himſelf; Conſtantine being now their great apoſtle. After he had ſeduced an infinite number of people, he was at laſt ſtoned by order of the emperor.

This ſect prevailed in Boſnia and the adjacent provinces about the cloſe of the 15th century; propagated their doctrines with confidence, and held their religious aſſemblies with impunity.

MANICORDON, or MANICHORD, a muſical inſtrument in form of a ſpinet; the ſtrings of which, like thoſe of the clarichord, are covered with little pieces of cloth, to deaden as well as to ſoften their ſound, whence it is alſo called the *dumb ſpinet*.

MANIFESTO; a public declaration made by a prince in writing, ſhowing his intentions to begin a war or other enterpriſe, with the motives that induce him to it, and the reaſons on which he founds his rights and pretenſions.

MANIHOT, or MANIOC. See JATROPHA, BOTANY *Index*.

MANILLA, LUCONIA, or *Luzon*, the name of the largeſt of the Philippine iſlands in the Eaſt Indies, ſubject to Spain. It had the name of *Luzon* from a cuſtom that prevailed among the natives of beating or bruiſing their rice in wooden mortars, before they either boiled or baked it; *luzon* in their language, ſignifying "a mortar."

Manilla.

As to ſituation, it is remarkably happy, lying between the eaſtern and weſtern continents, and having China on the north, at the diſtance of about 60 leagues; the iſlands of Japan on the north-eaſt, at the diſtance of about 250 leagues from the neareſt of them; the ocean on the eaſt; the other iſlands on the ſouth; and on the weſt Malacca, Patana, Siam, Cambodia, Cochin-China, and other provinces of India, the neareſt at the diſtance of 300 leagues.

The middle of this iſland is in latitude 15° north; the eaſt point in 13° 38′, and the moſt northern point in 19°. The ſhape of it is ſaid to reſemble that of an arm bent; the whole length being about 160 Spaniſh leagues, the greateſt breadth between 30 and 40, and the circumference about 350. As to the longitude the charts differ, ſome making the middle of the iſland to lie 113° eaſt from London, and others 106°. The climate is hot and moiſt. One thing is held very extraordinary, that in ſtormy weather there is much lightning and rain, and that thunder is ſeldom heard till this is over. During the months of June, July, Auguſt, and part of September, the weſt and ſouth winds blow, which they call *vendavales*, bringing ſuch rains and ſtorms, that the fields are all overflowed, and they are forced to have little boats to go from one place to another. From October till the middle of December, the north wind prevails; and from that time till May, the eaſt and ſouth-eaſt; which winds are there called *breezes*. Thus there are two ſeaſons in thoſe ſeas, by the Portugueſe called *monzeens;* whence our word *monſoons*, that is, the breezes half the year, with a ſerene dry air; and the vendavales the other half, wet and ſtormy. It is further to be obſerved, that in this climate no vermine breed upon Europeans, though they wear dirty ſhirts, whereas it is otherwiſe with the Indians. The days here being always of an equal length, and the weather never cold, neither their clothes, nor the hour of dining, ſupping, doing buſineſs, ſtudying, or praying, are ever changed; nor is cloth worn, but only againſt the rain.

The air here being, as has been obſerved, very hot and moiſt, is not wholeſome, but is worſe for young men that come from Europe than for the old. As for the natives, without uſing many precautions, they live very commonly to fourſcore or 100. The ſoil is ſo rich, that rice grows even on the tops of the mountains without being watered; and this makes it ſo plentiful, that the Indians value gold ſo little as not to pick it up, though it lies almoſt everywhere under their feet.

Among the diſadvantages of the iſland, beſides frequent and terrible earthquakes, here are ſeveral burning mountains. The face of the iſland, however, is far from being disfigured by them, or by the conſequences of their exploſions.

The mountaineers, called *Tingiani*, have no particular place of abode, but always live under the ſhelter of trees, which ſerve them inſtead of houſes, and furniſh them with food; and when the fruit is eaten up, they remove where there is a freſh ſort.

Here are 40 different ſorts of palm-trees, the moſt excellent cocoas, wild cinnamon, wild nutmegs, and ſome ſay wild cloves alſo; ebony; ſandal wood; the beſt caſſia, and in ſuch plenty, that they feed their hogs with its fruit; all kinds of cattle, and prodigious quantities of gold, amber, and ambergris.

There are ſeveral ſorts of people in this iſland beſides the Spaniards, as the Tagalians or Tagaleze, the Pintadoes or painted negroes, the Ilayas or Tinglianos, and the Negrellos. The Tagalians, who are thought to be Malayans by deſcent, are a modeſt, tractable, and well-diſpoſed people. The Pintadoes, or painted negroes, are tall, ſtraight, ſtrong, active, and of an excellent diſpoſition. The Tinglianos, whom ſome ſuppoſe to be deſcended from the Japaneſe, are very brave, yet very courteous and humane. They live entirely on the gifts of nature; and never ſleep under any other ſhade than that of the trees or a cave. The Negrelloes, who are held to be the aborigines of the iſland, are barbarous and brutal to the laſt degree. When they kill a Spaniard, they make a cup of his ſkull, and drink out of it.

This iſland is divided into ſeveral provinces, containing divers towns, the chief of which are Manilla, Caceres, New Segovia, Bondo, Paſſacao, Ibalon, Bulaw, Serſocon or Bagatao, Lampon, Fernandina, Bolinao, Playahonda, Cavite, Mindora, Caleleya, and Balayan.

Manilla, the capital of an iſland of the ſame name in the Eaſt Indies, on the ſouth-eaſt ſide of the iſland, where a large river falls into the ſea, and forms a noble bay 30 leagues in compaſs, to which the Spaniards have given the name of *Bahia*, becauſe the river runs out of the great lake Bahi, which lies at the diſtance of ſix leagues behind it. In compaſs it is two miles, in length one-third of a mile; the ſhape irregular, being narrow at both ends, and wide in the middle. On the ſouth it is waſhed by the ſea, and on the north and eaſt by the river; being alſo ſtrongly fortified with walls, baſtions, forts, and batteries.—Manilla contains about 30,000 ſouls, who are a very motley race, diſtinguiſhed by ſeveral ſtrange names, and produced by the conjunction of Spaniards, Chineſe, Malabars, Blacks, and others inhabiting the city and iſlands depending on it. Without the walls are large ſuburbs, particularly that inhabited by the Chineſe merchants, called *Sangleys*. In proportion to the ſize of the place, the number of churches and religious houſes is very great. Only ſmall veſſels can come up to Manilla; but three leagues ſouth of it is the town and port of Cavite, defended by the caſtle of St Philip, and capable of receiving the largeſt ſhips. Here ſtands the arſenal where the galleons are built, for which there are from 300 to 600 or 800 men conſtantly employed, who are relieved every month, and while upon duty are maintained at the king's expence. By an earthquake which happened here in 1645, a third part of the city of Manilla was deſtroyed, and no leſs than 3000 people periſhed in the ruins.

Spain having entered into engagements with France, in conſequence of the family-compact of the houſe of Bourbon, it was found expedient by Britain to declare war alſo againſt Spain. Whereupon a force was ſent out from our Eaſt India ſettlements, particularly Madras. for the conqueſt of the Philippine iſlands, under General Draper and Admiral Corniſh: who, after a ſiege of 12 days, took Manilla on the 6th of October 1762 by ſtorm; but to ſave ſo fine a city from deſtruction, agreed to accept a ranſom, amounting to a million ſterling, a part of which, it is ſaid, was never paid. The Spaniſh viceroy reſides in this city, and lives like a ſovereign prince. The government is ſaid to be one of the beſt in the gift of the king of Spain. When the city was taken, as above, the archbiſhop, who is a kind of pope in this part of the world, was alſo viceroy. Five large ſhips, loaded with the riches of the Eaſt, as diamonds from Golconda, cinnamon from Ceylon, pepper from Sumatra and Java, cloves and nutmegs from the Moluccas and Banda iſlands, camphire from Borneo, benjamin and ivory from Cambodia, ſilks, tea, and china-ware from China, &c. ſail yearly from hence to Acapulco in Mexico, and return freighted with ſilver, making 400 per cent. profit.

The city of Manilla is governed by two alcaides: the reſt of the cities and great towns have each an alcaide; and in every village there is a corregidore. Appeals from their ſentences are made to the royal court at Manilla, in which there are four judges, and a fiſcal or attorney-general; each of theſe judges has a ſalary of 3300 pieces of eight per annum. The viceroy is preſident; and in that quality has an income of 4000 pieces of eight, but he has no vote; yet if the judges are equally divided, the preſident names a doctor of the civil law, who, in virtue of his appointment, has a deciſive vote. The attorney-general, in right of his office, is protector of the Chineſe, in conſideration of which he receives 600 pieces of eight every year. As for the Indians that are in ſubjection, they pay tribute in the following proportions: Young men from 18, and from thence, if they continue ſingle, to the age of 60, pay five rials of plate by way of capitation; as ſingle women likewiſe do from 24 to 50: married men pay ten rials. It is computed that there are within the compaſs of this government 250,000 Indians ſubject to his Catholic majeſty, of whom two-fifths hold immediately from the king, and the reſt from lords or proprietors, who pay two rials each for maintenance of the forces, and the like ſum for the pariſh-prieſt. The royal revenue is computed at about half a million of pieces of eight, excluſive of caſualties. In regard to the military eſtabliſhment, the garriſon of Manilla conſiſts of about 800 or 1000 men, and there are about 3000 more in the Philippines. The viceroy is by his office captain-general, with a ſalary of about 4000 pieces of eight.

MANILIUS, Marcus, a Latin poet, whoſe poem had the ill luck to lie buried in ſome German libraries, and was not heard of in the world, until Poggius, about two centuries ago, publiſhed him from ſome old manuſcripts he found there. There is no account to be found of him but what can be drawn from his poem, which is called *Aſtronomicon*; and contains a ſyſtem of the ancient aſtronomy and aſtrology, together with the philoſophy of the Stoics. It conſiſts of five books; though there was a ſixth, which has not been recovered. From the ſtyle, and no mention of the author being found in ancient writers, it is probable he died young. It is collected, however, that he was a Roman of illuſtrious extraction, and lived under the reign of Auguſtus, whom he invokes, though not by name, yet by circumſtances and character that ſuit no other emperor. The best editions of Manilius are, that of Joseph Scaliger, in 1600, and that of Bentley at London in 1739.

MANILLE, in commerce, a large braſs ring in the form of a bracelet, either plain or engraven, flat or round.

Manilles are the principal commodities which the Europeans carry to the coaſt of Africa, and exchange with the natives for ſlaves. Theſe people wear them as ornaments on the ſmall of the leg, and on the thick part of the arm above the elbow. The great men wear manilles of gold and ſilver; but theſe are made in the country by the natives themſelves.

MANIOC, or MANIHOT. See JATROPHA, Botany *Index*.

MANIPULUS, MANIPULE, among the Romans, was a little body of infantry, which in the time of Romulus conſiſted of 100 men; and in the time of the conſuls, and firſt Cæſars, of 200.

The word properly ſignifies "a handful;" and, according to ſome authors, was firſt given to the handful of hay which they bore at the end of a pole, to diſtinguiſh themſelves by, before the cuſtom was introduced of bearing an eagle for their enſign; and hence came the phraſe, *a handful of men*. But Vegetius, Modeſtus, and Varro, give other etymologies of the word: the laſt derives it from *manus*, a little body of men following the ſame ſtandard. According to the former, this corps was called *manipulus*, becauſe they fought hand in hand or all together: *Contubernium etiam manipulus vocabatur ab eo, quod conjunctis manibus pariter dimicabant.*

Each manipule had two centurions, or captains, called *manipularii*, to command it; one whereof was lieutenant to the other. Each cohort was divided into three manipules, and each manipule into two centuries.

Aulus Gellius quotes an old author, one Cincius, who lived in the time of Hannibal (whoſe priſoner he was), and who, writing on the art of war, obſerves, that then each legion conſiſted of 60 centuries, of 30 manipules, and of ten cohorts. And again, Varro and Vegetius mention it as the leaſt diviſion in the army, only conſiſting of the tenth part of a century; and Spartian adds, that it contained no more than ten men. This ſhows that the manipulus was not always the ſame thing.

MANIPULUS is alſo an eccleſiaſtical ornament, worn by the prieſts, deacons, and ſubdeacons in the Romiſh church. It conſiſts of a little fillet in form of a ſtole, three or four inches broad, and made of the ſame ſtuff with the chaſuble; ſignifying and repreſenting an handkerchief which the prieſts in the primitive church wore on the arm to wipe off the tears they were continually ſhedding for the ſins of the people. There ſtill remains a mark of this uſage in a prayer rehearſed by thoſe who wear it; *Merear, Domine, portare manipulum fletus et doloris.*—The Greeks and Maronites wear two manipules, one on each arm.

MANIPULUS, among phyſicians, is uſed to ſignify a handful of herbs or leaves, or ſo much as a man can graſp in his hand at once; which quantity is frequently denoted by the abbreviature, M, or m.

MANIS, the SCALY LIZARD, a genus of quadrupeds belonging to the order of bruta. See MAMMALIA *Index*.

Manley, Manna.

MANLEY, MRS, the celebrated writer of the *Atalantis*, was the daughter of Sir Roger Manley, the reputed author of the firſt volume of the Turkiſh Spy. She loſt her parents very early; and after having been deluded into a falſe marriage by her guardian, who was her couſin, and afterwards deſerted her, ſhe was patronized by the ducheſs of Cleveland, miſtreſs of Charles II. But the ducheſs, being a woman of a very fickle temper, grew tired of Mrs Manley in ſix months time; and diſcharged her upon a pretence, whether groundleſs or not is uncertain, that ſhe intrigued with her ſon. After this ſhe wrote her firſt tragedy, called Royal Miſchief, which was acted with great applauſe in 1696; and her apartment being frequented by men of wit and gaiety, ſhe ſoon engaged in amours, and was taken into keeping. Her pen now grew as licentious as her conduct: for, in her retired hours, ſhe wrote four volumes, called Memoirs of the New Atalantis; in which ſhe was not only very free in her wanton tales of love adventures, but ſatirized the characters of many diſtinguiſhed perſonages, eſpecially thoſe who had a principal concern in the Revolution. A proſecution was commenced againſt her for this work; but whether thoſe in power were aſhamed to bring a woman to trial for a few amorous trifles, or whether the laws could not reach her diſguiſed ſatire, ſhe was diſcharged; and a total change of the miniſtry enſuing, Mrs Manley lived in high reputation and gaiety, amuſing herſelf with the converſation of wits, and writing plays, poems, and letters. She died in 1724.

MANLIUS CAPITOLINUS, the renowned Roman conſul and general, who ſaved the capitol when it was attacked by the Gauls in the night: he was alarmed by the cries of geeſe, which were ever after held ſacred. But being afterwards accuſed of aſpiring at the ſovereignty, he was thrown from the Tarpeian rock. See GAUL and ROME.

MANLIUS *Torquatus*, a celebrated conſul and Roman captain; had great wit, but a difficulty in expreſſing himſelf, which induced Manlius Imperioſus, his father, to keep him almoſt by force in the country. Pompey, tribune of the people, enraged at this inſtance of ſeverity, formed a deſign of accuſing Manlius the father before the judges; but Torquatus being informed of it, went to that tribune, and, with a poniard in his hand, made him ſwear, that he would not proceed in that accuſation againſt him to whom he owed his life. At length Torquatus was made military tribune, and killed a ſoldier of the Gauls in ſingle combat, from whom he took a gold chain that he wore about his neck. From this action he obtained the name of *Torquatus*. He was conſul in the war againſt the Latins; when he ordered his own ſon to be beheaded for fighting contrary to his orders, though he had gained the victory. He conquered the enemies of the republic, and was ſeveral times made conſul; but at laſt refuſed the conſulſhip, ſaying, That it was no more poſſible for him to bear with the vices of the people, than it was for the people to bear with his ſeverity.

MANNA, in the *Materia Medica*, the juice of certain

Manna.

the trees of this kind, either naturally concreted on the plants, or exſiccated and purified by art. See MATERIA MEDICA *Index*.

MANNA, is alſo a Scripture term, ſignifying a miraculous kind of food which fell from heaven for the ſupport of the Iſraelites in their paſſage through the wilderneſs, being in form of coriander ſeeds, its colour like that of bdellium, and its taſte like honey.

The Scriptures give to manna the name of the *bread of heaven*, and the *food of angels*, Pſalm lxxviii. 25. whether it would intimate to us, that the angels had prepared this food, or that angels themſelves, if they had need of any food, could not have any that was more agreeable than manna was. The author of the book of Wiſdom ſays, xvi. 20. 21. that manna ſo accommodated itſelf to every one's taſte, that every one found it pleaſing to him; and that it included every thing that was agreeable to the palate and fit for good nouriſhment; which expreſſions ſome have taken in the literal ſenſe, though others underſtand them figuratively.

The critics are divided about the original of the word *manna*. Some think that *man* is put inſtead of the Hebrew word *mah*, which ſignifies "What is this?" and that the Hebrews, then firſt ſeeing that new food which God had ſent them, cried to one another, מן הוא *man-hu*, inſtead of *mah-hu*, "What is this?" Others maintain, that the Hebrews very well knew before what manna was; and that, ſeeing it in great abundance about their camp, they ſaid one to another, *Man-hu*, "This is manna." Mr Saumaiſe and ſome other moderns are of this laſt opinion. They imagine, that the manna which God ſent the Iſraelites was nothing elſe but that fat and thick dew which ſtill falls in Arabia, which preſently condenſed, and ſerved for food to the people; that this is the ſame thing as the wild honey, mentioned Matth. iii. 4. wherewith John the Baptiſt was fed; and that the miracle of Moſes did not conſiſt in the production of any new ſubſtance, but in the exact and uniform manner in which the manna was diſpenſed by Providence for the maintenance of ſuch a great multitude.

On the contrary, the Hebrews and Orientals believe, that the fall of the manna was wholly miraculous. The Arabians call it the *ſugar-plums of the Almighty*; and the Jews are ſo jealous of this miracle, that they pronounce a curſe againſt all ſuch as preſume to deny the interpoſition of a miraculous power.

Our tranſlation, and ſome others, make Moſes fall into a plain contradiction in relating this ſtory of the manna, which they render thus: "And when the children of Iſrael ſaw it, they ſaid one to another, It is manna; for they wiſt not what it was." Exodus xvi. 15. Whereas the Septuagint, and ſeveral authors both ancient and modern, have tranſlated the text according to the original, "The Iſraelites ſeeing this, ſaid one to another, What is this? for they knew not what it was." For we muſt obſerve, that the word by which they aſked, *what is this?* was in their language *man*, which ſignifies likewiſe meat ready provided; and therefore it was always afterwards called *man* or *manna*.

Whether this manna had thoſe extraordinary qualities in it or not, which ſome imagine, it muſt be allowed to be truly miraculous, upon the following accounts. 1. That it fell but ſix days in the week. 2. That it fell in ſuch a prodigious quantity, as ſuſtained almoſt three millions of ſouls. 3. That there fell a double quantity every Friday, to ſerve them for the next day, which was their Sabbath. 4. That what was gathered on the firſt five days ſtunk and bred worms if kept above one day: but that which was gathered on Friday kept ſweet for two days. And, laſtly, That it continued falling while the Iſraelites abode in the wilderneſs, but ceaſed as ſoon as they came out of it and had got corn to eat in the land of Canaan.

Manna Tree, is a ſpecies of the aſh, and a native of Calabria in Italy. See FRAXINUS, BOTANY *Index*, and MATERIA MEDICA *Index*.

MANNER, in painting, a habitude that a man acquires in the three principal parts of painting, the management of colours, lights, and ſhadows; which is either good or bad according as the painter has practiſed more or leſs after the truth, with judgement and ſtudy. But the beſt painter is he who has no manner at all. The good or bad choice he makes is called *taſte*.

MANNERS, the plural noun, has various ſignifications; as the general way of life, the morals, or the habits, of any perſon or people; alſo ceremonious behaviour, or ſtudied civility. See the next article.

Good MANNERS, according to Swift, is the art of making thoſe people eaſy with whom we converſe.

Whoever makes the feweſt perſons uneaſy, is the beſt bred in the company.

As the beſt law is founded upon reaſon, ſo are the beſt manners. And as ſome lawyers have introduced unreaſonable things into common law; ſo likewiſe many teachers have introduced abſurd things into common good manners.

One principal point of this art is to ſuit our behaviour to the three ſeveral degrees of men; our ſuperiors, our equals, and thoſe below us.

For inſtance, to preſs either of the two former to eat or drink is a breach of manners; but a tradeſman or a farmer muſt be thus treated, or elſe it will be difficult to perſuade them that they are welcome.

Pride, ill nature, and want of ſenſe, are the three great ſources of ill manners; without ſome one of theſe defects, no man will behave himſelf ill for want of experience; or of what, in the language of fools, is called *knowing the world*.

"I defy (proceeds our author), any one to aſſign an incident wherein reaſon will not direct us what we are to ſay or to do in company, if we are not miſled by pride or ill nature. Therefore, I inſiſt that good ſenſe is the principal foundation of good manners; but becauſe the former is a gift which very few among mankind are poſſeſſed of, therefore all the civilized nations of the world have agreed upon fixing ſome rules for common behaviour, beſt ſuited to their general cuſtoms, or fancies, as a kind of artificial good ſenſe to ſupply the defects of reaſon. Without which, the gentleman's part of dunces would be perpetually at cuffs, as they ſeldom fail when they happen to be drunk, or engaged in ſquabbles about women or play. And, God be thanked, there hardly happens a duel in a year, which may not be imputed to one of thoſe three motives. Upon which account, I ſhould be exceedingly ſorry to find the legiſlature make any [illegible] againſt the practice of duelling; becauſe the methods are eaſy, and many, for a wiſe man to avoid a quarrel with honour, or engage in it with innocence. And I can diſcover no political evil, in ſuffering bullies, ſharpers, and rakes, to rid the world of each other by a method of their own, where the law hath not been able to find an expedient.

"As the common forms of good manners were intended for regulating the conduct of thoſe who have weak underſtandings; ſo they have been corrupted by the perſons for whoſe uſe they were contrived. For theſe people have fallen into a needleſs and endleſs way of multiplying ceremonies, which have been extremely troubleſome to thoſe who practiſe them, and inſupportable to every body elſe; inſomuch that wiſe men are often more uneaſy at the over civility of theſe refiners, than they could poſſibly be in the converſations of peaſants or mechanics.

"The impertinences of this ceremonial behaviour are nowhere better ſeen than at thoſe tables, where ladies preſide who value themſelves upon account of their good breeding; where a man muſt reckon upon paſſing an hour without doing any one thing he hath a mind to, unleſs he will be ſo hardy as to break through all the ſettled decorum of the family. She determines what he loveth beſt, and how much he ſhall eat; and if the maſter of the houſe happeneth to be of the ſame diſpoſition, he proceedeth in the ſame tyrannical manner to preſcribe in the drinking part: at the ſame time you are under the neceſſity of anſwering a thouſand apologies for your entertainment. And although a good deal of this humour is pretty well worn off among many people of the beſt faſhion, yet too much of it ſtill remaineth, eſpecially in the country; where an honeſt gentleman aſſured me, that having been kept four days againſt his will at a friend's houſe, with all the circumſtances of hiding his boots, locking up the ſtable, and other contrivances of the like nature, he could not remember, from the moment he came into the houſe to the moment he left it, any one thing wherein his inclination was not directly contradicted; as if the whole family had entered into a combination to torment him.

"But, beſides all this, it would be endleſs to recount the many fooliſh and ridiculous accidents I have obſerved among theſe unfortunate proſelytes to ceremony. I have ſeen a ducheſs fairly knocked down by the precipitancy of an officious coxcomb running to ſave her the trouble of opening a door. I remember, upon a birth-day at court, a great lady was rendered utterly diſconſolate, by a diſh of ſauce let fall by a page directly upon her head-dreſs and brocade, while ſhe gave a ſudden turn to her elbow upon ſome point of ceremony with the perſon who ſat next her. Monſieur Buys, the Dutch envoy, whoſe politics and manners were much of a ſize, brought a ſon with him about 13 years old to a great table at court. The boy and his father, whatever they put on their plates, they firſt offered round in order, to every perſon in the company; ſo that we could not get a minute's quiet during the whole dinner. At laſt their two plates happened to encounter, and with ſo much violence, that, being china, they broke in twenty pieces, and ſtained half the company with wet ſweetmeats and cream.

"There is a pedantry in manners as in all arts and ſciences, and ſometimes in trades. Pedantry is properly the overrating any kind of knowledge we pretend to. And if that kind of knowledge be a trifle in itſelf, the pedantry is the greater. For which reaſon I look upon fiddlers, dancing-maſters, heralds, maſters of the ceremony, &c. to be greater pedants than Lipſius, or the elder Scaliger. With theſe kind of pedants, the court, while I knew it, was always plentifully ſtocked: I mean from the gentleman-uſher (at leaſt) incluſive, downward to the gentleman-porter; who are, generally ſpeaking, the moſt inſignificant race of people that this iſland can afford, and with the ſmalleſt tincture of good manners, which is the only trade they profeſs. For being wholly illiterate, converſing chiefly with each other, they reduce the whole ſyſtem of breeding within the forms and circles of their ſeveral offices: and as they are below the notice of miniſters, they live and die in court under all revolutions, with great obſequiouſneſs to thoſe who are in any degree of credit or favour, and with rudeneſs and inſolence to every body elſe. From whence I have long concluded, that good manners are not a plant of the court growth: for if they were, thoſe people who have underſtandings directly of a level for ſuch acquirements, and who have ſerved ſuch long apprenticeſhips to nothing elſe, would certainly have picked them up. For as to the great officers who attend the prince's perſon or councils, or preſide in his family, they are a tranſient body, who have no better a title to good manners than their neighbours, nor will probably have recourſe to gentlemen-uſhers for inſtruction. So that I know little to be learned at court on this head, except in the material circumſtance of dreſs; wherein the authority of the maids of honour muſt indeed be allowed to be almoſt equal to that of a favourite actreſs.

"I remember a paſſage my Lord Bolingbroke told me: That going to receive Prince Eugene of Savoy at his landing, in order to conduct him immediately to the queen, the prince ſaid he was much concerned that he could not ſee her majeſty that night; for Monſieur Hoffman (who was then by) had aſſured his highneſs, that he could not be admitted into her preſence with a tied-up periwig; that his equipage was not arrived; and that he had endeavoured in vain to borrow a long one among all his valets and pages. My lord turned the matter to a jeſt, and brought the prince to her majeſty: for which he was highly cenſured by the whole tribe of gentlemen uſhers; among whom Monſieur Hoffman, an old dull reſident of the emperor's, had picked up this material point of ceremony; and which, I believe, was the beſt leſſon he had learned in 25 years reſidence.

"I make a difference between *good manners* and *good breeding*; although, in order to vary my expreſſion, I am ſometimes forced to confound them. By the firſt, I only underſtand the art of remembering, and applying, certain ſettled forms of general behaviour. But *good breeding* is of a much larger extent: for beſides an uncommon degree of literature ſufficient to qualify a gentleman for reading a play, or a political pamphlet, it taketh in a great compaſs of knowledge; no leſs than that of dancing, fighting, gaming, making the circle of Italy, riding the great horſe, and ſpeaking French; not to mention ſome other ſecondary or ſubaltern accompliſhments, which are more eaſily

Manners,
Mannory.

ſily acquired. So that the difference between good breeding and good manners lieth in this, That the former cannot be attained to by the beſt underſtandings without ſtudy and labour; whereas a tolerable degree of reaſon will inſtruct us in every part of good manners without other aſſiſtance.

" I can think of nothing more uſeful upon this ſubject, than to point out ſome particulars wherein the very eſſentials of good manners are concerned, the neglect or perverting of which doth very much diſturb the good commerce of the world, by introducing a traffic of a mutual uneaſineſs in moſt companies.

" Firſt, A neceſſary part of good manners is a punctual obſervance of time at our own dwellings or thoſe of others, or at third places; whether upon matters of civility, buſineſs, or diverſion; which rule, though it be a plain dictate of common reaſon, yet the greateſt miniſter* I ever knew, was the greateſt treſpaſſer againſt it; by which all his buſineſs doubled upon him, and placed him in a continual arrear. Upon which I often uſed to rally him as deficient in point of good manners. I have known more than one ambaſſador, and ſecretary of ſtate, with a very moderate portion of intellectuals, execute their offices with great ſucceſs and applauſe, by the mere force of exactneſs and regularity. If you duly obſerve time for the ſervice of another, it doubles the obligation; if upon your own account, it would be manifeſt folly, as well as ingratitude, to neglect it; if both are concerned, to make your equal or inferior attend on you to his own diſadvantage, is pride and injuſtice.

* Harley
arl of Ox-
ord, lord
gh trea-
rer to
Queen
Anne.

" Ignorance of forms cannot properly be ſtyled *ill manners*: becauſe forms are ſubject to frequent changes; and conſequently, being not founded upon reaſon, are beneath a wiſe man's regard. Beſides, they vary in every country; and after a ſhort period of time vary frequently in the ſame: ſo that a man who travelleth muſt needs be at firſt a ſtranger to them in every court through which he paſſeth; and, perhaps, at his return, as much a ſtranger in his own; and, after all, they are eaſier to be remembered or forgotten than faces or names.

" Indeed, among the many impertinencies that ſuperficial young men bring with them from abroad, this bigotry of forms is one of the principal, and more predominant than the reſt: who look upon them not only as if they were matters capable of admitting of choice, but even as points of importance; and therefore are zealous upon all occaſions to introduce and propagate the new forms and faſhions they have brought back with them: ſo that, uſually ſpeaking, the worſt bred perſon in the company is a young traveller juſt arrived from abroad."

MANNORY, Lewis, advocate of the parliament of Paris, where he was born in 1696, and died in 1777. From him we have 18 vols. 12mo of *Pleadings* and *Memoirs*. A great number of ſingular caſes occur in this collection: and the author has the talent of rendering them more ſtriking by the agreeable manner in which they are ſtated. He was Travenol's counſel in his proceſs againſt Voltaire, and was very ſatirical againſt that poet. The latter took revenge by deſcribing him as a mercenary babbler, who ſold his pen and his abuſe to the higheſt bidder. Whatever may be the caſe, Mannory would certainly have been more eſteemed, both as an advocate and as a writer, if he had paid more attention to his ſtyle, and had been leſs prolix; if he had thought more deeply, and been more ſparing of his pleaſanty in caſes where nothing was required but knowledge and ſound reaſoning. He publiſhed alſo a tranſlation into French of Father Parée's funeral Oration on Louis XIV. and very judicious Obſervations on the Semiramis of Voltaire.

Manœuvre,
Manometer.

MANOEUVRE, in a military ſenſe, conſiſts ſolely in diſtributing equal motion to every part of a body of troops, to enable the whole to form, or change their poſition, in the moſt expeditious and beſt method, to anſwer the purpoſes required of a battalion, brigade, or line of cavalry, artillery, or infantry. It has always been lamented, that men have been brought on ſervice without being informed of the uſes of the different manœuvres they have been practiſing; and, having no ideas of any thing but the uniformity of the parade, inſtantly fall into diſorder and confuſion when they loſe the ſtep, or ſee a deviation from the ſtraight lines they have been accuſtomed to at exerciſe. It is a pity to ſee ſo much attention given to ſhow, and ſo little to inſtruct the troops in what may be of uſe to them in real ſervice. No manœuvre ſhould be executed in preſence of the enemy, unleſs protected by ſome diviſion of the troops.

MANOMETER, or Manoscope, an inſtrument to ſhow or meaſure the alterations in the rarity or denſity of the air. The manometer differs from the barometer in this, That the latter only ſerves to meaſure the *weight* of the atmoſphere, or of the column of air over it; but the former, the denſity of the air in which it is found; which denſity depends not only on the weight of the atmoſphere, but alſo on the action of heat and cold, &c. Authors, however, generally confound the two together; and Mr Boyle himſelf gives us a very good manometer of his contrivance, under the name of a *ſtatical barometer*, conſiſting of a bubble of thin glaſs, about the ſize of an orange, which, being counterpoiſed when the air was in a mean ſtate of denſity, by means of a nice pair of ſcales, ſunk when the atmoſphere became lighter, and roſe as it grew heavier.

Other kinds of manometers were made uſe of by Colonel Roy, in his attempts to correct the errors of the barometer. " They were (ſays he) of various lengths, from four to upwards of eight feet: they conſiſted of ſtraight tubes, whoſe bores were commonly from $\frac{1}{15}$th to $\frac{1}{25}$th of an inch in diameter. The capacity of the tube was carefully meaſured, by making a column of quickſilver, about three or four inches in length, move along it from one end to the other. Theſe ſpaces were ſeverally marked, with a fine edged file, on the tubes; and transferred from them to long ſlips of paſteboard, for the ſubſequent conſtruction of the ſcales reſpectively belonging to each. The bulb, attached to one end of the manometer at the glaſs-houſe, was of the form of a pear, whoſe point being occaſionally opened, dry or moiſt air could be readily admitted, and the bulb ſealed again, without any ſenſible alteration in its capacity.

" The air was confined by means of a column of quickſilver, long or ſhort, and with the bulb downward or upwards, according to the nature of the propoſed experiment. Here it muſt be obſerved, that, from the adheſion of the quickſilver to the tube, the manometer will not act truly, except it be in a vertical poſition; and even then it is neceſſary to give it a ſmall degree of motion, to bring the quickſilver into its true place; where it will remain in equilibrio, between the exterior preſſure of the atmoſphere on one ſide, and the interior elaſtic force of the confined air on the other.

"Pounded ice and water were uſed to fix a freezing point on the tube; and by means of ſalt and ice, the air was farther condenſed, generally four, and ſometimes five or ſix degrees below zero. The thermometer and manometer were then placed in a tin veſſel among water, which was brought into violent ebullition; where, having remained a ſufficient time, and motion being given to the manometer, a boiling point was marked thereon. After this the fire was removed, and the gradual deſcents of the column of quickſilver, correſponding to every 20 degrees of temperature in the thermometer, were ſucceſſively marked on a deal rod applied to the manometer. It is to be obſerved, that both inſtruments, while in the water, were in circumſtances perfectly ſimilar; that is to ſay, the ball and bulb were at the bottom of the veſſel.

"In order to be certain that no air had eſcaped by the ſide of the quickſilver during the operation, the manometer was frequently placed a ſecond time in melting ice. If the barometer had not altered between the beginning and end of the experiment, the quickſilver always became ſtationary at or near the firſt mark. If any ſudden change had taken place in the weight of the atmoſphere during that interval, the ſame was noted, and allowance made for it in afterwards proportioning the ſpaces.

"Long tubes, with bores truly cylindrical, or of any uniform figure, are ſcarcely ever met with. Such however as were uſed in theſe experiments, generally tapered in a pretty regular manner from one end to the other. When the bulb was downwards, and the tube narrowed that way, the column of quickſilver confining the air lengthened in the lower half of the ſcale, and augmented the preſſure above the mean. In the upper half, the column being ſhortened, the preſſure was diminiſhed below the mean. In this caſe, the obſerved ſpaces both ways from the centre were diminiſhed in the inverſe ratio of the heights of the barometer at each ſpace, compared with its mean height. If the bore widened towards the bulb when downwards, the obſerved ſpaces, each way from the centre, were augmented in the ſame inverſe ratio; but in the experiments on air leſs denſe than the atmoſphere, the bulb being upwards, the ſame equation was applied with contrary ſigns: and if any extraordinary irregularity took place in the tube, the correſponding ſpaces were proportioned both ways from that point, whether high or low, that anſwered to the mean.

"The obſerved and equated manometrical ſpaces being thus laid down on the paſteboard containing the meaſures of the tube; the 212° of the thermometer, in exact proportion to the ſections of the bore, were [illegible] of them; hence the coincidences with each other were eaſily ſeen; and the number of manometrical degrees anſwering to each manometrical ſpace readily transferred into a table then prepared for the purpoſe."

Manometer, for the air pump. This is a ſmall glaſs tube about two or three inches long, hermetically ſealed at one end, and open at the other, being divided regularly into inches and lines. It is uſed for aſcertaining the rarefaction of the air produced by working an air pump. The tube previouſly filled with mercury, is placed in the receiver of an air pump. As the piſton is worked, the mercury gradually ſinks in the tube, and the expanſion is eſtimated by its height; for the ſmaller the height at which the mercury in the tube ſtands above the mercury in the baſon, the greater is the expanſion.

MANOR, Manerium (*à manendo*, becauſe the uſual reſidence of the owner), ſeems to have been a diſtrict of ground held by lords or great perſonages; who kept in their own hands ſo much land as was neceſſary for the uſe of their families, which were called *terræ dominicales*, or *demeſne lands*; being occupied by the lord, as *dominus manerii*, and his ſervants. The other, or *tenemental lands*, they diſtributed among their tenants; which, from the different modes of tenure, were called and diſtinguiſhed by two different names.—Firſt, *book-land*, or charter land, which was held by deed under certain rents and free ſervices, and in effect differed nothing from free ſocage lands: and from hence have ariſen moſt of the freehold tenants who hold of particular manors, and owe ſuit and ſervice to the ſame. The other ſpecies was called *folk-land*, which was held by no aſſurance in writing, but diſtributed among the common folk or people at the pleaſure of the lord, and reſumed at his diſcretion; being indeed land held in villenage. See Villenage.

Blackſt. Comment.

The reſidue of the manor, being uncultivated, was termed the *lord's waſte*, and ſerved for public roads, and for common of paſture to the lord and his tenants. Manors were formerly called *baronies*, as they ſtill are *lordſhips;* and each lord or baron was empowered to hold a domeſtic court, called the *court baron*, for redreſſing miſdemeſnors and nuſances within the manor, and for ſettling diſputes of property among the tenants. This court is an inſeparable ingredient of every manor; and if the number of ſuitors ſhould ſo fail, as not to leave ſufficient to make a jury or homage, that is, two tenants at the leaſt, the manor itſelf is loſt.

In the early times of our legal conſtitution, the king's greater barons, who had a large extent of territory held under the crown, granted out frequently ſmaller manors to inferior perſons to be held of themſelves; which do therefore now continue to be held under a ſuperior lord, who is called in ſuch caſes the *lord paramount* over all theſe manors; and his ſeignory is frequently termed an *honour*, not a *manor*; eſpecially if it hath belonged to an ancient feodal baron, or hath been at any time in the hands of the crown. In imitation whereof, theſe inferior lords began to carve out and grant to others ſtill more minute eſtates to be held as of themſelves, and were ſo proceeding downwards *in infinitum*, till the ſuperior lords obſerved, that, by this method of ſubinfeudation, they loſt all their feodal profits of wardſhips, marriages, and eſcheats,

cheats, which fell into the hands of these mesne or middle lords, who were the immediate superiors of the terre-tenant, or him who occupied the land; and also that the mesne lords themselves were so impoverished thereby, that they were disabled from performing their services to their own superiors. This occasioned, first, that provision in the 33d chapter of *magna charta*, 9 Hen. III. (which is not to be found in the first charter granted by that prince, nor in the great charter of King John), that no man should either give or sell his land without reserving sufficient to answer the demands of his lord; and, afterwards, the statute of Westm. 3. or *quia emptores*, 18 Edw. I. c. 1. which directs, that, upon all sales, or feoffments of land, the feoffee shall hold the same, not of his immediate feoffor, but of the chief lord of the fee, of whom such feoffor himself held it. But these provisions not extending to the king's own tenants *in capite*, the like law concerning them is declared by the statutes of *prærogativa regis*, 17 Edward II. c. 6. and of 34 Edw. III. c. 15. by which last all subinfeudations, previous to the reign of King Edward I. were confirmed; but all subsequent to that period were left open to the king's prerogative. And from hence it is clear, that all manors existing at this day, must have existed as early as King Edward the First: for it is essential to a manor, that there be tenants who hold of the lord; and, by the operation of these statutes, no tenant *in capite* since the accession of that prince, and no tenant of a common lord since the statute of *quia emptores*, could create any new tenant to hold of himself. See VILLENAGE.

MANS, an ancient, rich, and populous town of France, capital of the county of Maine, with a bishop's see. Its wax and capons are famous. It is seated on a high hill near the river Sarr, in E. Long. 0. 10. N. Lat. 47. 58.

MANSE, MANSUS, *Mansa*, or *Mansum*; in ancient law-books, denotes a *house*, or habitation, either with or without land. See HOUSE and MANSION. The word is formed *à manendo*, "abiding;" as being the place of dwelling or residence.

Capital Mansus, (*Mansum capitale*), denotes the *manor-house*, or lord's court. See MANOR.

Mansus Presbyteri, is a parsonage or vicarage house for the incumbent to reside in. This was originally, and still remains, an essential part of the endowment of a parish church, together with the glebe and tythes. It is sometimes called *Presbyterium*. See PRESBYTERY.

MANSFELD, a city of Germany, and capital of a county of the same name, in the circle of Upper Saxony. E. Long. 12. 55. N. Lat. 51. 35.

MANSFELD, PETER ERNEST, COUNT OF, was descended from one of the most illustrious families in Germany, and which has produced the greatest number of distinguished characters. In 1552, he was taken prisoner at Ivry, where he commanded; and he was afterwards of great service to the Catholics at the battle of Montcontour. In consequence of his great talents, he was employed in affairs of the utmost delicacy and importance. Being made governor of Luxemburg, he maintained tranquillity in that province, while the rest of the Low Countries was a prey to the horrors of civil war. In testimony of their gratitude, the States caused the following inscription to be placed on the gate of the hotel de ville: *In Belgio omnia dum vastat civile bellum, Mansfeldius [illegible] pace sua, hanc provinciam in fide continuit, [illegible], cum summo populi consensu et hilari [illegible].* He was afterwards appointed to the command of the Low Countries; and died at Luxemburg, March 21. 1604 at the age of 87, with the title of *Prince of the Holy Empire*. His mausoleum, in bronze, which is to be seen in the chapel bearing his name, and adjoining to the church of the Recollects at Luxemburg, is an admirable work. Four highly finished weepers, with which this monument was ornamented, were carried off by Louis XIV. when he took this city in 1684. To a love of war, Mansfeld united a taste for the sciences; and he was a lover and encourager of the arts: he possessed a great and elevated mind; but, like many heroes ancient and modern, he was greedy of gain and lavish of blood. Abbé Schannat has written the history of the count of Mansfeld in Latin; printed at Luxemburg, 1707. Charles prince of Mansfeld, his lawful son, signalized himself in the wars of Flanders and Hungary; and died without issue in 1595, after having beaten the Turks who attempted to relieve the city of Gran (Strigonia), which he was besieging.

MANSFELD, *Ernest de*, the illegitimate son of Peter Ernest by a lady of Malines, was educated at Brussels, in the principles of the Roman Catholic religion, by his godfather Ernest archduke of Austria. He was employed in the service of the king of Spain in the Low Countries, and in that of the emperor in Hungary, together with his brother Charles count of Mansfeld. He was legitimated on account of his bravery by the emperor Rodolphus II.; but his father's posts and possessions in the Spanish Netherlands having been refused him, contrary to promises which he had received, he, in 1610, joined the party of the Protestant princes. Being now become one of the most dangerous enemies of the house of Austria, who called him the *Attila of Christianity*, he set himself, in 1618, at the head of the rebels in Bohemia, and got possession of Pilsen in 1619. Though his troops were defeated in several battles, he was able to penetrate into the palatinate. He there took several places, ravaged Alsace, made himself master of Haguenau, and defeated the Bavarians. At length he was totally defeated by Walstein, at the battle of Dassou, which happened in the month of April 1626. He gave over his remaining troops to the duke of Weimar, and intended to pass into the Venetian states; but fell sick in a village between Zaro and Spalatro, and there expired, A. D. 1626, aged 46. The procurator Nani thus describes him: "He was bold, intrepid in danger, and the most skilful negotiator of the age in which he lived. He possessed a natural eloquence, and well knew how to insinuate himself into the hearts of those whom he wished to gain. He was greedy of others wealth, and prodigal of his own.—He was full of vast projects and great hopes, and yet possessed neither lands nor money at his death." He did not wish to die in his bed; but dressed himself in his finest robes, put on his sword, sat up, leaning upon two domestics, and in this position, highly becoming a warrior, breathed his last. But of all the actions of this great captain and ſingular man, the following is without doubt the moſt extraordinary: Having got the moſt certain information that Cazel, in whom of all his officers he placed the greateſt confidence, had communicated his plans to the Auſtrian chief, he ſhowed neither paſſion nor reſentment at his treachery, but gave him 300 rix-dollars, and ſent him to Count Bucquoy, with a letter expreſſed in theſe words: "Cazel being attached to you and not to me, I ſend him to you, that you may have the benefit of his ſervices." The opinions of men were divided about this action, and it was as much cenſured as applauded. Be this as it may, Mansfeld is deſervedly eſteemed one of the greateſt generals of his age. There never was a better man, more patient, more indefatigable, more inured to toil and hardſhip, to watchings, to colds and to hunger. He raiſed armies, and ravaged the enemy's territories with an incredible celerity. The Hollanders ſaid of him, that he was *bonus in auxilio, carus in pretio*; that is, that he rendered great ſervices to thoſe who employed him, but that he made them pay well for it.

MANSFIELD, a town of Nottinghamſhire, in England, ſeated in the foreſt of Sherwood, 140 miles from London. It was anciently a royal demeſne. It has a market on Thurſdays, and two fairs. By an ancient cuſtom of this manor, the heirs were declared of age as ſoon as born. It is a well-built town, and has a great trade in malt. Its market is well ſtocked with corn, cattle, &c. Here is a charity ſchool for 36 boys.

MANSIO, a term often mentioned in itineraries, denoting *inns* on the public roads to lodge in, at the diſtance of eighteen miles from each other; (Lactantius). Alſo, in the lower ages, it came to denote "an encampment for one night," (Lampridius).

Mansio, or *Manſum*, was ſometimes alſo uſed in the ſame ſenſe with *hide*; that is, for as much land as one plough could till in a year. See Hide.

MANSION, Manſio, a dwelling houſe, or habitation, eſpecially in the country. See Manse.

Mansion is more particularly uſed for the lord's chief dwelling houſe within his fee; otherwiſe called the *capital meſſuage* or *manſe*, or chief manor-place. See Manor.

MANSLAUGHTER, the unlawful killing of another, without malice either expreſs or implied: Which may be either voluntary, upon a ſudden heat; or involuntarily, but in the commiſſion of ſome unlawful act. Theſe were called, in the Gothic conſtitutions, *homicidia vulgaria; quæ aut caſu, aut etiam ſponte committuntur, ſed in ſubitaneo quodam iracundiæ calore et impetu.* And hence it follows, that in manſlaughter there can be no acceſſories before the fact; becauſe it muſt be done without premeditation.

1. As to the firſt, or voluntary branch: If upon a ſudden quarrel two perſons fight, and one of them kills the other, this is manſlaughter: and ſo it is, if they upon ſuch an occaſion go out and fight in a field: for this is one continued act of paſſion; and the law pays that regard to human frailty, as not to put a haſty and deliberate act upon the ſame footing with regard to guilt. So alſo if a man be greatly provoked, as by pulling his noſe, or other great indignity, and immediately kills the aggreſſor; though this is not excuſable *ſe defendendo*, ſince there is no abſolute neceſſity for doing it to preſerve himſelf; yet neither is it murder, for there is no previous malice; but it is manſlaughter. But in this, and in every other caſe of homicide upon provocation; if there be a ſufficient cooling-time for paſſion to ſubſide and reaſon to interpoſe, and the perſon ſo provoked afterwards kills the other, this is deliberate revenge, and not heat of blood; and accordingly amounts to murder. So if a man takes another in the act of adultery with his wife, and kills him directly upon the ſpot; though this was allowed by the law of Solon, as likewiſe by the Roman civil law (if the adulterer was found in the huſband's own houſe), and alſo among the ancient Goths; yet in England it is not abſolutely ranked in the claſs of juſtifiable homicide, as in caſe of a forcible rape, but it is manſlaughter. It is, however, the loweſt degree of it; and therefore in ſuch a caſe the court directed the burning in the hand to be gently inflicted, becauſe there could not be a greater provocation. Manſlaughter, therefore, on a ſudden provocation, differs from excuſable homicide *ſe defendendo* in this: That in the one caſe there is apparent neceſſity, for ſelf-preſervation, to kill the aggreſſor: in the other no neceſſity at all, being only a ſudden act of revenge.

Manſlaughter.

2. The ſecond branch, or involuntary manſlaughter, differs alſo from homicide excuſable by miſadventure, in this: That miſadventure always happens in conſequence of a lawful act, but this ſpecies of manſlaughter in conſequence of an unlawful one. As if two perſons play at ſword and buckler, unleſs by the king's command, and one of them kills the other; this is manſlaughter, becauſe the original act was unlawful; but it is not murder, for the one had no intent to do the other any perſonal miſchief. So where a perſon does an act, lawful in itſelf, but in an unlawful manner, and without due caution and circumſpection; as when a workman flings down a ſtone or piece of timber into the ſtreet, and kills a man; this may be either miſadventure, manſlaughter, or murder according to the circumſtances under which the original act was done. If it were in a country village, where few paſſengers are, and he calls out to all people to have a care, it is miſadventure only: but if it were in London, or other populous towns, where people are continually paſſing, it is manſlaughter, though he gives loud warning; and murder, if he knows of their paſſing and gives no warning at all, for then it is malice againſt all mankind. And, in general, when an involuntary killing happens in conſequence of an unlawful act, it will be either murder or manſlaughter according to the nature of the act which occaſioned it. If it be in proſecution of a felonious intent, or in its conſequences naturally tending to bloodſhed, it will be murder; but if no more was intended than a mere civil treſpaſs, it will only amount to manſlaughter.

3. As to the puniſhment of this degree of homicide: The crime of manſlaughter amounts to felony, but within the benefit of clergy; and the offender ſhall be burnt in the hand, and forfeit all his goods and chattels.

But there is one ſpecies of manſlaughter, which is puniſhed as murder, the benefit of clergy being taken away from it by ſtatute: namely, the offence of mortally

tally ſtabbing another, though done upon ſudden provocation. See STABBING.

MANTA, in *Ichthyology*; a flat fiſh mentioned by Ulloa and others, as exceedingly hurtful to the pearl-fiſhers, and which ſeems to be the ſame with that which Pliny has deſcribed under the name of *nubes* or *nebula*: *Ipſi ferunt* (Urinatores) *et nubem quandam craſſeſcere ſuper capita, planorum piſcium ſimilem, prementem eos arcentemque a reciprocando, et ob id ſtilos præacutos lineis annexos habere ſeſe; quia niſi perfoſſæ ita, non recedant caliginis et pavoris, ut arbitror, opere. Nubem enim ſive nebulam (cujus nomine id malum appellant) inter animalia haud ullam reperit quiſquam.* (Plin. Hiſt. lib. ix. cap. 46.) The account given of this *cloud* by thoſe divers is much the ſame with that which the divers in the American ſeas give of the manta; and the name of the cloud is perfectly applicable to it, as it really ſeems to be a cloud to thoſe who are in the water below it: the ſwimmers likewiſe carry long knives, or ſharp ſticks, for the purpoſe of diſperſing this animal. It is not improbable, that this fiſh has made its way into thoſe ſeas from thoſe of the old world, in the ſame manner as ſome others appear to have done. The ſtrength of this fiſh is ſo great, that it will not only ſtrangle a man whom it embraces or winds itſelf about, but it has even been ſeen to take the cable of an anchor and move it from the place where it had been caſt. It has been called *manta*, becauſe, when it lies ſtretched upon the ſea, as it frequently does, it ſeems like a fleece of wool floating upon the water.

MANTE, a conſiderable town of France, capital of the Mantois, ſeated on the river Seine, in E. Long. 1. 45. N. Lat. 48. 58.

MANTEGAR, or MAN-TIGER, as it is ſometimes written, is the tufted ape, a ſpecies of ſimia. See MAMMALIA *Index*.

MANTEGNA, ANDREW, was born in a village near Padua in 1451, and at firſt employed in keeping ſheep. It was obſerved, that inſtead of watching over his flock, he amuſed himſelf with drawing; and he was placed with a painter who, being delighted with his eaſe and taſte in work, and with his gentle and agreeable conduct in ſociety, adopted him for his ſon, and made him his heir. At the age of 17, Mantegna was employed to paint the altar of St Sophia in Padua, and the four evangeliſts. James Bellini, who admired his talents, gave him his daughter in marriage. Mantegna painted, for the duke of Mantua, the *Triumph of Cæſar*, which is the chief d'oeuvre of this painter, and has been engraved in claro-obſcuro, in nine plates. From reſpect to his extraordinary merit, the duke made him knight of his order. The invention of engraving prints with the graver is commonly aſcribed to Mantegna, who died at Mantua in 1517.

MANTELETS, in the art of war, a kind of moveable parapets, made of planks about three inches thick, nailed one over another, to the height of almoſt ſix feet, generally caſed with tin, and ſet upon little wheels, ſo that in a ſiege they may be driven before the pioneers, and ſerve as blinds to ſhelter them from the enemy's ſmall ſhot.

MANTICHORA, a name given by the Roman authors to a fierce and terrible creature, which they deſcribe from the Greeks, who call it ſometimes alſo *mantichora, martichora*, and *manticora*. We have formed the name *man-tiger* on the ſound of the Roman name, though expreſſing a very different ſenſe; and our authors of the hiſtories of animals, figure to us under this name a terrible creature, partly from the accounts of Pliny exaggerated, and partly from their own imagination, with three rows of teeth, and with ſuch a ſhape as no animal ever poſſeſſed. See MANTEGAR.

MANTINEA, in *Ancient Geography*, a town ſituated in the ſouth of Arcadia, on the confines of Laconia (Ptolemy;) called afterwards *Antigonia*, in honour of King Antigonus. It is memorable for a battle fought in its neighbourhood between the Thebans and Spartans, in which fell the celebrated commander Epaminondas. See THEBES.

MANTIS, a genus of inſects belonging to the order of hemiptera. See ENTOMOLOGY *Index*.

MANTLE, or MANTLE *Tree*, in *Architecture*, the lower part of the chimney, or that piece of timber which is laid acroſs the jambs, and ſuſtains the compartments of the chimney-piece.

MANTLE, or *Mantling*, in *Heraldry*, that appearance of folding of cloth, flouriſhing, or drapery, which in any achievement is drawn about a coat of arms. See HERALDRY, ſect. v.

MANTO, in poetic hiſtory, the daughter of Tireſias, and like her father ſtrongly inſpired with prophecy. She was in ſo great eſteem, that when the Epigones pillaged Thebes, they thought they could not acquit their vow to Apollo, of conſecrating to him the moſt precious thing in their plunder, without offering him this young woman. She was therefore ſent to the temple of Delphi. But this did not engage her to any vow of continency; or, if it did, ſhe obſerved it very ill: for ſhe bore a ſon called *Amphilochus* to Alcmeon, who had been generaliſſimo of the army which took Thebes; and a daughter of the ſame, named *Tiſiphone*. Theſe children were the fruit of an amour carried on during the madneſs which had ſeized Alcmeon, after he had put his mother to death. Virgil tranſports her into Italy, nor for the ſake of ſecuring her virginity, but to produce a ſon of her who built Mantua.

MANTUA, anciently a town of the Tranſpadana in Italy, ſituated on the Mincio, a river running from the Lacus Benacus. It is ſaid to have been founded about 300 years before Rome by Bianor or Ocnus, the ſon of Manto; and was the ancient capital of Etruria. When Cremona, which had followed the intereſt of Brutus, was given to the ſoldiers of Octavius, Mantua alſo, which was in the neighbourhood, ſhared the common calamity, and many of the inhabitants were tyrannically deprived of their poſſeſſions. Virgil, who was among them, and a native of the town, applied for redreſs to Auguſtus, and obtained it by means of his poetical talents.

It is ſtill called MANTUA, and is the capital of the duchy of that name. It is now a large place, having eight gates and about 16,000 inhabitants. The ſtreets are broad and ſtraight, and the houſes well built. It is very ſtrong by ſituation as well as by art; lying in the middle of a lake, or rather moraſs, formed by the river Mincio. There is no acceſs to the city but by two cauſeways which croſs this moraſs, and which are ſtrongly fortified: ſo that the city is looked upon to be one of the moſt conſiderable fortreſſes of Europe; and the allies in 1745, though their army was in the duchy, durſt not undertake the ſiege. It was greatly noted for its ſilk manufactures, which are now much decayed. The air in the ſummer time is very unwholeſome. The celebrated poet Virgil was born at a village near this city. It was beſieged by the French for ſeveral months, in 1796, and ſurrendered to them on February 2d, 1797. On the recommencement of the war, it was attacked by the Auſtrian and Ruſſian army, to which it ſurrendered on the 30th of July, 1799, after a ſhort ſiege; and finally, not only this city, but the whole country, was ſubdued by the arms of Bonaparte, one of whoſe brothers is now ſtyled king of Italy. E. Long. 10. 47. N. Lat. 45. 10.

Mantua, the duchy of, a country of Italy, lying along the river Po, which divides it into two parts. It is bounded on the north by the Veroneſe; on the ſouth by the duchies of Reggio, Modena, and Mirandola; on the eaſt by the Ferrareſe; and on the weſt by the Cremoneſe. It is about 50 miles in length, and 25 in breadth; is fruitful in corn, paſtures, flax, fruits, and excellent wine. Charles IV. the laſt duke of Mantua, being a vaſſal of the empire, took part with the French in the diſpute relating to the ſucceſſion of Spain; for which reaſon he was put under the ban of the empire, and died at Venice in 1708. He having no heirs, the emperor kept the Mantuan in his own hands, and the duke of Savoy had Montſerrat, which were confirmed to them by ſubſequent treaties. After the death of the emperor in 1740, his eldeſt daughter, now empreſs queen, kept poſſeſſion of the Mantuan; and the governor of the Milaneſe had the adminiſtration of affairs. The Mantuan comprehends the duchies of Mantua, Guaſtalla, and Sabioneta; the principalities of Caſtiglione, Solforino, and Boſolo; likewiſe the county of Novellara. The principal rivers are the Po, the Oglio, and the Mincio; and the principal town is Mantua.

MANUAL, a word ſignifying any thing performed by the hand.

Manual (*manualis*), in *Law*, ſignifies what is employed or uſed by the hand, and whereof a preſent profit may be made; as ſuch a thing in the manual occupation of one, is where it is actually uſed or employed by him.

Manual is the name of a ſervice book uſed in the church of Rome, containing the rites, directions to the prieſts, and prayers uſed in the adminiſtration of baptiſm and other ſacraments; the form of bleſſing holy water, and the whole ſervice uſed in proceſſions.

Manual Exerciſe, in the army, conſiſts in the obſervance of certain words of command appointed for this purpoſe. When a regiment is drawn up, or paraded for exerciſe, the men are placed three deep, either by companies, or divided into platoons, with the grenadiers on the right. When ſoldiers are drawn up for exerciſe, the ranks and files ſhould be exactly even; and each ſoldier ſhould be inſtructed to carry his arms well, to keep his firelock ſteady and even upon his ſhoulder, with the right hand hanging down, and the whole body without conſtraint. The diſtances between the files muſt be equal, and the ranks eight feet diſtant from each other. Every motion ſhould be performed with life, and the greateſt exactneſs obſerved in all firings, wheelings, and marching; and therefore a regiment ſhould never be under arms longer than two hours.

The following is an abſtract of the words of command at the manual exerciſe, with their explanations. 1. *Poize your firelock*: i. e. Seize the firelock with your right hand, and turn the lock outwards, keeping the firelock perpendicular; then bring up the firelock with a quick motion from the ſhoulder, and ſeize it with the left hand, juſt above the lock, ſo that the fingers may lie upon the ſtock, with the elbows down, and the thumb upon the ſtock; the firelock muſt not be held too far from the body, and the left hand muſt be of an equal height with the eyes. 2. *Cock your firelock*: i. e. Turn the barrel oppoſite to your face, and place your thumb upon the cock, raiſing your elbow ſquare at this motion; then cock your firelock, by drawing your elbow down, placing your right thumb on the breech pin, and the fingers under the guard. 3. *Preſent*: i. e. Step back about ſix inches to the rear with the right foot, bringing the left toe to the front; at the ſame time the butt-end of the firelock muſt be brought to an equal height with the ſhoulder, placing the left hand on the ſwell, and the fore finger of the right hand before the trigger, ſinking the muzzle a little. 4. *Fire*: i. e. Pull the trigger briſkly, and immediately after, bringing up the right foot to the inſide of the left, come to the priming poſition, with the lock oppoſite to the right breaſt, the muzzle to the height of the hat, keeping it firm and ſteady; and at the ſame time ſeize the cock with the fore finger and thumb of the right hand, the back of the hand being turned up. 5. *Half-cock your firelock*: i. e. Half-bend the cock briſkly with a draw-back of the right elbow, bringing it cloſe to the butt of the firelock. 6. *Handle your cartridge*: i. e. Bring your right hand with a ſhort round to your pouch, ſlapping it hard; ſeize the cartridge, and bring it with a quick motion to your mouth; bite the top well off, and bring the hand as low as the chin, with the elbow down. 7. *Prime*: i. e. Shake the powder into the pan, placing the three laſt fingers behind the rammer, with the elbow up. 8. *Shut your pan*: i. e. Shut your pan briſkly, drawing your right arm at this motion towards your body, holding the cartridge faſt in your hand as before; then turn the piece nimbly round to the loading poſition, with the lock to the front, and the muzzle to the height of the chin, bringing the right hand behind the muzzle, with both feet kept faſt in this motion. 9. *Charge with cartridge*: i. e. Turn up your hand, and put the cartridge into the muzzle, ſhaking the powder into the barrel; place your hand, cloſed, with a quick and ſtrong motion, upon the rammer. 10. *Draw your rammer*: i. e. Draw the rammer with a quick motion half out, ſeizing it at the muzzle back-handed; draw it quite out, turn it, and enter it into the muzzle. 11. *Ram down your charge*; i. e. Ram the cartridge well down in the barrel, inſtantly recovering and ſeizing the rammer back-handed at the centre, turning it, and entering it as far as the lower pipe, placing at the ſame time the edge of the hand on the butt end of the rammer, with fingers extended. 12. *Return your rammer*: i. e. Return the rammer, bringing up the piece with the left hand to the ſhoulder, ſeizing it with the right hand under the cock, keeping the left hand faſt at the ſwell, turning the body ſquare to the front. 13. *Shoulder your firelock:* i. e. Quit the left hand, and place it ſtrong upon the butt; quit the right hand, and throw it down the right ſide. 14. *Reſt your firelock:* i. e. Seize the firelock with the right hand, turning the lock outwards; raiſe the firelock from the ſhoulder, and place your left hand with a quick motion above the lock, holding the piece right up and down in both hands before you, and your left hand even with your eyes; ſtep briſkly back with your right foot, placing it a hand's breadth diſtance from your left heel, and at the ſame time bring down your firelock as quick as poſſible to the reſt, ſinking it as far down before your left hand as your right hand will permit without conſtraint: your left hand being at the feather ſpring, and your right, with fingers extended, held under the guard, taking care to draw in the muzzle well towards your body, and to dreſs in a line with the butt-end. 15. *Order your firelock:* i. e. Place your firelock nimbly with your left hand againſt your right ſhoulder; quit the firelock with the right hand, ſinking it at the ſame time with your left; ſeize it at the muzzle, which muſt be of an equal height with your chin, and hold it cloſe againſt your right ſide; lift up your right foot, and place it by your left; at the ſame time throw back your left hand by your left ſide, and with your right bring down the butt-end ſtrong upon the ground, placing it even with the toe of your right foot; the thumb of your right hand lying along the barrel, and the muzzle kept at a little diſtance from your body. 16. *Ground your firelock:* i. e. Half face to the right upon your heels, and at the ſame time turn the firelock, ſo that the lock may point to the rear, and the flat of the butt-end lie againſt the inſide of your foot; at the ſame time ſlipping the right foot behind the butt of the firelock, the right toe pointing to the right, and the left to the front: ſtep directly forward with your left foot, about as far as the ſwell of the firelock, and lay it upon the ground, your left hand hanging down by your left leg, and your right kept faſt, with the butt end againſt it; raiſe yourſelf up again nimbly, bringing back your left foot to its former poſition, keeping your body faced to the right; face again to the left upon your heels, and come to your proper front, letting your hands hang down without motion. 17. *Take up your firelock:* i. e. Face to the right upon both heels; ſink your body down, and come to the poſition deſcribed in the ſecond motion of grounding; raiſe yourſelf and firelock, bringing it cloſe to your right ſide; come to your proper front, ſeizing your firelock at the muzzle, as in explanation 15. 18. *Reſt your firelock:* i. e. Bring your right hand as far as the ſwell; raiſe the firelock high up in a perpendicular line from the ground with your right hand, and ſeize it with your left above the ſpring, the cock being at the height of the waiſt-belt; ſtep back with your right foot, placing it behind your left heel, and come to the reſt. 19. *Shoulder your firelock:* i. e. Lift up your right foot, and place it by your left; bring the firelock at the ſame time to your left ſhoulder, and ſeize the butt-end with the left hand, keeping it in the ſame poſition, as above deſcribed; throw your right hand briſkly back. 20. *Secure your firelock:* i. e. Bring the right hand briſkly up, and place it under the cock, keeping the firelock ſteady in the ſame poſition; quit the butt with the left hand, and ſeize the firelock with it at the ſwell, bringing the elbow cloſe down upon the lock: the right hand being kept faſt in this poſition, and the piece held upright; quit the right hand, and bring it down your right ſide, bringing the firelock cloſe down to the ſecure, and the left hand in a line with the waiſt belt. 21. *Shoulder your firelock:* i. e. Bring the firelock up to a perpendicular line, ſeizing it with the right hand under the cock; quit the left hand, and place it ſtrong upon the butt, quit the right hand, and bring it ſmartly down the right ſide. 22. *Fix your bayonets:* i. e. Firſt and ſecond motions, as in the two firſt of the ſecure; quit the right hand, and bring the firelock ſmartly down to the left ſide with the left hand, as far as it will admit without conſtraint, ſeizing the bayonet at the ſame time with the right hand, and fixing it, placing that hand juſt below the braſs, with the piece kept cloſe to the hollow of the ſhoulder. 23. *Shoulder your firelock:* i. e. Quit the right hand, and bring up the firelock with the left; ſeize it again under the cock with your right, as in the ſecond motion of the ſecure; quit the left hand, and place it ſtrong upon the butt; quit the right hand, and bring it down the right ſide. 24. *Preſent your arms:* i. e. as explained in the three motions of the 14th word of command. 25. *To the right face:* i. e. Bring up the firelock with a quick motion high before you, till your left hand comes even with your eyes, both the fingers of that hand extended along the ſtock, juſt above the feather-ſpring, the right foot to be brought cloſe up to the left heel in this motion; face to the right, taking care in facing to hold the firelock right up and down, and ſteady in your hands; ſtep back with your right foot, and come down to your *preſent*, as in the foregoing explanation. 26. *To the right face:* i. e. as in the foregoing explanation, facing to the right. 27. *To the right about face:* i. e. as in the 25th explanation, only coming to the right about inſtead of to the right. 28. *To the left face:* i. e. Bring the right foot briſkly to the hollow of your left, with the firelock in the ſame poſition as in the firſt motion of *facing to the right:* face to the left; come down to the *preſent*, as before. 29. *To the left face:* i. e. as in the foregoing explanation. 30. *To the left about face:* i. e. as before, coming to the left-about inſtead of to the left. 31. *Shoulder your firelock:* i. e. as in the two motions of the 19th explanation. 32. *Charge your bayonets:* i. e. as in the firſt explanation: bring the ſwell of the firelock down ſtrong upon the palm of the hand, graſping the piece at the ſmall, behind the lock, and as high as the waiſt-belt; the firelock upon a level with the barrel upwards. 33. *Shoulder your firelock:* i. e. Bring up the firelock to the ſhoulder, place the left hand upon the butt, bringing the feet ſquare to the front; quit the right hand, and throw it down the right ſide. 34. *Advance your arms:* i. e. firſt and ſecond motions, as in the firſt explanation; bring the firelock down the right ſide, with the right hand as low as it will admit without conſtraint, ſlipping up the left hand at the ſame time to the ſwell, the guard between the thumb and forefinger of the right hand, the three laſt fingers under the cock, with the barrel to the rear; quit the left hand. 35. *Shoulder your firelock:* i. e. Bring up the left hand, and ſeize it at the ſmall; come ſmartly up to the poize; ſhoulder. 36. *Prime and load*: i. e. Come ſmartly to the *recover*, by ſpringing the firelock ſtraight up with the left hand, turning the barrel inwards to the proper height of the recover: at the ſame time that the left hand ſprings the firelock, the right hand is raiſed briſkly from the right ſide, and ſeizes the firelock acroſs the breaſt: as it riſes below the cock, the left hand comes with a quick motion from the butt, and ſeizes the firelock ſtrong above the lock, the little finger of the left hand at the ſpring of the lock, the left hand at an equal height with the face, the butt cloſe to the body, but not preſſed, the firelock, perpendicular oppoſite the left ſide of the face: bring the firelock down with a briſk motion to the priming poſition, the left hand holding the firelock, as in priming; the thumb of the right hand placed againſt the face of the ſteel, the fingers clinched, and the elbow a little turned out, that the wriſt may be clear of the cock: open the pan, by throwing up the ſteel with a ſtrong motion of the right arm, turning the elbow in, and keeping the firelock ſteady in the left hand; handle your cartridge, prime, ſhut your pan, caſt about, load, draw rammers, ram down the cartridge, return the rammers, ſhoulder. *N. B.* The motion of recover, and coming down to the priming poſition and opening pans, are to be done in the uſual time. The motions of handling cartridge to ſhutting the pans, are to be done as quick as poſſible: when the pans are ſhut, a ſmall pauſe is to be made, and then caſt about together; then the loading motions are to be done as quick as poſſible; but before the rammer is returned, another ſmall pauſe is to be made, counting 1, 2, between each motion, till the firelock is ſhouldered.—*Front rank make ready*: i. e. Spring the firelock briſkly to the *recover*, keeping the left foot faſt in this motion: as ſoon as the firelock is at the *recover*, without any ſtop, ſink the body briſkly without ſtooping forward, with a quick motion down upon the right knee; the butt-end of the firelock at the ſame time falls upon the ground, the front part of the butt being in a line with the heel of the left foot. As ſoon as the butt comes to the ground, the firelock is to be cocked, immediately ſeizing the cock and ſteel in the right hand: the firelock to be held firm in the left hand, about the middle of that part of the firelock between the lock and the ſwell of the ſtock; the point of the left thumb to be cloſe to the ſwell, pointing upwards. As the body is ſinking, the right knee is to be thrown ſo far back as the left leg may be right up and down; the right foot to be thrown a little to the right: the body to be kept ſtraight; the head up, looking to the right along the rank, the ſame as if ſhouldered; the firelock to be upright, and the butt about four inches to the right of the inſide of the left foot. *Preſent*: i. e. Spring the firelock briſkly down to the *preſent*, by extending the left arm to the full length with a ſtrong motion; at the ſame time ſpring up the butt by the [illegible], and raiſe the butt ſo high upon the right ſhoulder, that you may not be obliged to ſtoop too much with the head; the right cheek to be cloſe to the butt, and the left eye ſhut, and look along the barrel with the right eye from the breech-pin to the muzzle; kept the left elbow down in an eaſy poſition, and ſtand as ſteady as poſſible; the thumb of the right hand to remain in the poſition as deſcribed in the third explanation of the manual. *Fire*: i. e. Pull the trigger as directed in the manual; and as ſoon as the piece is fired, give yourſelf a ſtrong ſpring upon your left leg, raiſing your body briſkly, and ſtraight up, keeping your left foot faſt, and bringing the right heel to the inſide of the left; at the ſame time the firelock is to be brought up to the priming poſition, and half-cocked immediately: a ſhort pauſe is to be made; then handle cartridge, and go on with the loading motions deſcribed in the explanation of *prime and load*.—*Centre rank, make ready*: i. e. Spring the firelock briſkly to the recover; ſo ſoon as the left hand ſeizes the firelock above the lock, the right elbow is to be nimbly raiſed a little, placing the thumb of that hand upon the cock; the fingers open by the plate of the lock, and as quick as poſſible force the piece to the cock, by dropping the elbow, and forcing down the cock with the thumb, ſtepping at the ſame time a moderate pace to the right, keeping the left foot faſt; as the firelock is cocked, the thumb is to fall below the cock, the right hand ſeizing the firelock cloſe under the cock firmly, the fore finger not to be before the trigger; the piece to be held in this poſition perpendicular, oppoſite the left ſide of the face, the butt cloſe to the left breaſt, but not preſſed; the body to be ſtraight, and as full to the front as poſſible; the head kept up, looking to the right of the rank, that the body and the firelock may not ſtoop forward, nor lean much out of the rank. *Preſent*: i. e. Spring the firelock from the body to the arm's length with a quick motion, preſſing down the muzzle with the left hand, and ſpring up the butt with the right hand, as in the foregoing explanation of the *front rank*. *Fire*: As in explanation 4, in the manual, with this difference, that the left foot is to be brought up to the right, at the ſame time that the firelock is brought down to the priming poſition. The loading motions as in the explanations of priming and loading; and at the laſt motion of ſhouldering, to ſpring to the left again, and cover the file-leaders.—*Rear rank, make ready*: i. e. Recover the firelock, and cock as before directed for the centre rank; as the firelock is recovered and cocked, ſtep briſkly ſtraight to the right, with the right foot, a full pace; bring the left heel about ſix inches before the right foot; the body ſtraight, and as ſquare to the front as poſſible, as in the explanation of the *centre rank*. *Preſent*: As in explanation *preſent*, before. *Fire*: As in explanation of the *centre rank*; and as the firelock is coming down to the priming poſition, the left is to be brought back to the right; and at the laſt motion of ſhouldering, to ſpring to the left again, and cover the file-leader (A).

There

(A) The manual exerciſe now deſcribed is not preciſely the ſame that it is at preſent (1807). The difference [illegible] depending partly on the peculiar views of commanding officers, it is ſo ſubject to change [illegible] it in its preciſe form.

Manuductor ‖ Manumiſſion.

There are ſome peculiar words of command at the manual exerciſe of the grenadiers, when apart from the battalion; and alſo for the cavalry and artillery.

MANUDUCTOR, a name given to an ancient officer in the church; who, from the middle of the choir, where he was placed, gave the ſignal for the choriſters to ſing, and marked the meaſure, beat time, and regulated the muſic. The Greeks called him *meſochoros*, becauſe ſeated in the middle of the choir: but in the Latin church he was called *manuductor*; from *manus* and *duco*, "I lead;" becauſe he led and guided the choir by the motions and geſture of the hand.

MANUFACTURE, a commodity produced from raw or natural materials, either by the work of the hand or by machinery.

MANUFACTURER, one who works up a natural product into an artificial commodity.

MANUMISSION, an act whereby a ſlave or villain is ſet at liberty, or let out of bondage. The word comes from the Latin *manus* "hand;" and *mittere*, "to ſend; *quia ſervus mittebatur extra manum ſeu poteſtatem domini ſui*. Some authors define manumiſſion an act by which a lord enfranchiſes his tenants, who till that time had been his vaſſals, and in a ſtate of ſlavery inconſiſtent with the ſanctity of the Chriſtian faith.

Among the Romans, the manumiſſion of ſlaves was performed three ſeveral ways. 1. When, with his maſter's conſent, a ſlave had his name entered in the cenſus or public regiſter of the citizens. 2. When the ſlave was led before the prætor, and that magiſtrate laid his wand called *vindicta* on his head. 3. When the maſter gave the ſlave his freedom by his teſtament. Servius Tullius is ſaid to have ſet on foot the firſt manner; and P. Valerius Publicola the ſecond. A particular account is given of the third in the Inſtitutes of Juſtinian. It was not neceſſary that the prætor ſhould be on his tribunal to perform the ceremony of manumiſſion: he did it anywhere indifferently, in his houſe, in the ſtreet, in going to bathe, &c. He laid the rod on the ſlave's head, pronouncing theſe words, *Dico eum liberum eſſe more Quiritum*, "I declare him a freeman, after the manner of the Romans." This done, he gave the rod to the lictor, who ſtruck the ſlave with it on the head, and afterwards with his hand on his face and back; and the notary or ſcribe entered the name of the new freedman in the regiſter, with the reaſons of his manumiſſion. The ſlave had likewiſe his head ſhaved, and a cap given him by his maſter as a token of freedom. Tertullian adds, that he had then alſo a third name given him: if this were ſo, three names were not a token of nobility, but of freedom. The emperor Conſtantine ordered the manumiſſions at Rome to be performed in the churches.

Of manumiſſion there have alſo been various forms in England. In the time of the Conqueror, villains were manumitted, by the maſter's delivering them by the right hand to the viſcount, in full court, ſhowing them the door, giving them a lance and a ſword, and proclaiming them free. Others were manumitted by charter. There was alſo an implicit manumiſſion; as when the lord made an obligation for payment of money to the bondman at a certain day, or ſued him where he might enter without ſuit, and the like.

MANURE, any thing uſed for fattening and improving land. See AGRICULTURE, *Index*.

MANUSCRIPT, a book or paper *written with the hand*; by which it ſtands oppoſed to a *printed* book or paper. A manuſcript is uſually denoted by the two letters MS. and in the plural by MSS. What makes public libraries valuable, is the number of ancient manuſcripts repoſited in them; ſee ALEXANDRIAN, CAMBRIDGE, CLERMONT, COTTONIAN, HARLEIAN, VATICAN, &c.

MANUTIUS, ALDUS, the firſt of thoſe celebrated Venetian printers who were as illuſtrious for their learning as for uncommon ſkill in their profeſſion. He was born at Baſſano in Italy about the middle of the 15th century; and hence is ſometimes called *Baſſianus*, though generally better known by the name of *Aldus*. He was the firſt who printed Greek neatly and correctly; and acquired ſo much reputation by it, that whatever was finely printed was proverbially ſaid to have "come from the preſs of Aldus." We have a kind of Greek grammar of his; with Notes upon Homer, Horace, &c. He died at Venice, where he exerciſed his profeſſion, in 1516.

MANUTIUS, *Paulus*, ſon of the former, was brought up to his father's profeſſion. He was more learned than he; and he acquired, by continual reading of Tully, ſuch a purity in writing Latin, as even Scaliger allows a Roman could not exceed. Pope Pius IV. placed him at the head of the apoſtolical preſs, and gave him the charge of the Vatican library. His Epiſtles are infinitely laboured, and very correct; but, as may be ſaid of moſt of the Ciceronians, they contain ſcarcely any thing but mere words. This conſtant reading of Tully, however, together with his profound knowledge of antiquity, qualified him extremely well for an editor of Tully; whoſe works he accordingly publiſhed, with Commentaries on them, in 4 vols folio, at Venice in 1523. He died in 1574.

MANUTIUS, *Aldus*, the Younger, the ſon of Paulus, and the grandſon of Aldus, was eſteemed one of the greateſt geniuſes and moſt learned men of his time. Clement VIII. gave him the direction of the Vatican printing houſe; but probably the profits of that place were very ſmall, ſince Manutius was obliged, for his ſubſiſtence, to accept of a profeſſor of rhetoric's chair, and to ſell the excellent library that was in his family, which his father, his uncle, and his great-uncle, had collected with extraordinary care, and which it is ſaid conſiſted of 80,000 volumes. He died at Rome in 1597, without any other recompenſe than the praiſes due to his merit. He wrote, 1. Commentaries on Cicero. 2. A Treatiſe on Orthography. 3. Three books of Epiſtles; and other works in Latin and Italian, which are eſteemed.

MAON, in *Ancient Geography*, a town of the tribe of Judah, to the ſouth-eaſt, towards the Dead Sea. It gave name to the *wilderneſs of Maon*, 1 Sam. xxiii.

MAOUNA, one of the Navigators iſlands in the ſouth Pacific ocean. Here M. de la Peyrouſe, commander of the French ſhips the Bouſſole and Aſtrolabe, met with his firſt fatal accident in 1787; M. de Langle, who commanded the Aſtrolabe, with 11 officers and [illegible] were maſſacred by the natives. W. Long. 169. S. Lat. 14. 19.

MAP, a plane figure, repreſenting the ſurface of the earth, or a part thereof, according to the laws of perſpective. See GEOGRAPHY *Index*.

MAPLE. See ACER, BOTANY *Index*.

Maple-Sugar. See SUGAR, CHEMISTRY *Index*.

MAPPA, in the public games of the Roman circus, was a napkin hung out at the prætor's or other great magiſtrate's ſeat, as a ſignal for the race or other exerciſes to begin. The mappa was received by the mapparius, or perſon who held it, from the conſul, prætor, or other great officer. Notice was anciently given by ſound of trumpet; but Nero is ſaid to have introduced the mappa, by throwing his napkin out of the window to ſatisfy the people, who grew noiſy at the delay of the ſports while he was at dinner.

MAPPARIUS, in Roman antiquity, the officer who gave the ſignal to the gladiators to begin fighting; which he did by throwing an handkerchief that he had received from the emperor of other magiſtrate.

MARACANDA, in *Ancient Geography*, capital of the Sogdiana. Now thought to be *Samarcand*, a city of Uſbec Tartary in Aſia, the country and royal reſidence of Tamerlane. See SAMARCAND.

MARACAYBO, a rich and conſiderable town of South America, and capital of the province of Venezuela, ſeated near a lake of the ſame name. It carries on a great trade in ſkins and chocolate, which is the beſt in America; and they have likewiſe very fine tobacco. It was taken by the French bucaniers in 1666 and 1678. W. Long. 70. 45. N. Lat. 10. 0.

MARACAYBO, a lake in South America, 200 miles long and 100 broad, which diſcharges itſelf by a river into the North ſea. It is well defended by ſtrong forts; which, however, did not hinder Sir Henry Morgan, a bucanier, from entering it, and plundering ſeveral Spaniſh towns on the coaſt, after defeating a ſquadron ſent out againſt him.

MARAGNAN, a province of Brazil in South America, which comprehends a fertile populous iſland, 112 miles in circumference. The French ſettled here in 1612, and built a town; but they were ſoon driven from thence by the Portugueſe, who have poſſeſſed it ever ſince. The town is little, but ſtrong; and has a caſtle, a harbour, and a biſhop's ſee. The climate is very agreeable and wholeſome, and the ſoil produces plenty of all the neceſſaries of life. W. Long. 54. 35. S. Lat. 2. 0.

MARALDI, JAMES-PHILIP, a learned mathematician and aſtronomer, of the Academy of Sciences at Paris, was born in 1665. He was the ſon of Francis Maraldi and Angela Catharine Caſſini, the ſiſter of the famous aſtronomer of that name. His uncle made him go to France in 1687, where he acquired great reputation on account of his learning and obſervations. He made a catalogue of the fixed ſtars, which is more particular and exact than Bayer's; and has given a great number of curious and intereſting obſervations in the memoirs of the academy; in particular, thoſe on bees and petrifactions have been univerſally applauded. He died in 1729.

MARANA, JOHN-PAUL, an ingenious writer of the 17th century, was of a diſtinguiſhed family, and born at Genoa; where he received an education ſuitable to his birth, and made a great progreſs in the ſtudy of polite literature and the ſciences. Having been engaged in the conſpiracy of Raphael della Torre, to deliver up Genoa to the duke of Savoy, he was in 1670, when 28 years of age, impriſoned in the tower of that city, and remained there four years. Being at length ſet at liberty, he was ordered to write the hiſtory of that conſpiracy; but, when finiſhed, it was ſeized and prevented from being publiſhed. When the republic of Genoa was at variance with the court of France, Marana, who had always an inclination for that court, was afraid of being impriſoned a ſecond time; and retired to Monaco, where he again wrote the hiſtory of the conſpiracy in Italian; and, in 1682, went to Lyons to get it printed. From Lyons he went to Paris, where his merit ſoon acquired him powerful protectors. He ſpent the reſt of his life in a happy and tranquil mediocrity, devoted to ſtudy and the ſociety of men of learning; and died in 1693. His hiſtory of the conſpiracy contains many curious and intereſting anecdotes, which are nowhere elſe to be found. He alſo wrote ſeveral other works; the moſt known of which is the Turkiſh Spy, in 6 vols 12mo, which was in 1742 augmented to ſeven. Of this ingenious work we have an excellent Engliſh tranſlation.

Marana ‖ Marathon.

MARANO, a town of Italy, in the territory of Venice and province of Friuli, with a ſtrong citadel; ſeated in a marſh at the bottom of the gulf of Venice, which renders it difficult of acceſs.

MARANS, a rich town of France, in the territory of Aunis and diocese of Rochelle, ſeated among ſalt marſhes, near the river Sevre, three miles from the ſea. It carries on a very great trade in corn; and is ſeated in W. Long. 0. 55. N. Lat. 46. 20.

MARANTA, INDIAN ARROW-ROOT, a genus of plants belonging to the monandria claſs; and in the natural method ranking under the eighth order *Scitamineæ*. See BOTANY *Index*.

MARASMUS, among phyſicians, denotes an atrophy or conſumption in its laſt and moſt deplorable ſtage.

MARATHON, in *Ancient Geography*, one of the demi or hamlets of Attica; about 10 miles to the north-eaſt of Athens, towards Bœotia, near the ſea. It ſtill retains its ancient name (Dr Chandler informs us); but is very inconſiderable, conſiſting only of a few houſes and gardens. The plain of Marathon, famous for Miltiades's victory over the Perſians, by which the liberties of Athens and other cities of Greece were ſaved, is long and narrow, but conſiſting chiefly of level ground, and therefore admitting the operations of cavalry, which formed the main ſtrength of the barbarian army, and with which the Greeks were very poorly provided. Here the Perſians, under the command of Datis, pitched their camp, by the advice of Hippias the baniſhed king of Athens, whoſe ſolicitations and intrigues had promoted the expedition, and whoſe perfect knowledge of the country, and intimate acquaintance with the affairs of Greece, rendered his opinion on all occaſions reſpectable. The Perſian army is ſaid to have conſiſted of 100,000 infantry, and 10,000 horſe.—Athens was in the utmoſt conſternation and diſmay. She had, upon the first appearance of the Perſian fleet, ſent to requeſt aſſiſtance from the other nations of Greece; but ſome had ſubmitted to Darius, and others trembled at the very name of the Medes and Perſians. The Lacedæmonians alone promiſed troops; but various obſtacles did not allow them immediately to form a junction with thoſe of Athens. This city therefore could only rely on its own ſtrength; and happily at this moment there appeared three men deſtined to give new energy to the ſtate. Theſe were Miltiades, Ariſtides, and Themiſtocles; whoſe example and harangues kindled the flame of the nobleſt heroiſm in the minds of the Athenians. Levies were immediately made. Each of the ten tribes furniſhed 1000 foot ſoldiers with a commander at their head. To complete this number it was neceſſary to enrol the ſlaves (A). No ſooner were the troops aſſembled than they marched out of the city into the plain of Marathon, where the inhabitants of Platæa in Bœotia ſent them a reinforcement of 1000 infantry.

Scarcely were the two armies in ſight of each other, before Miltiades propoſed to attack the enemy. Ariſtides and ſeveral of the commanders warmly ſupported this meaſure: but the reſt, terrified at the exceſſive diſproportion of the armies, were deſirous of waiting for the ſuccours from Lacedæmon. Opinions being divided, they had recourſe to that of the polemarch, or chief of the militia, who was conſulted on ſuch occaſions, to put an end to the equality of ſuffrages. Miltiades addreſſed himſelf to him, with the ardour of a man deeply impreſſed with the importance of preſent circumſtances: "Athens (ſaid he to him) is on the point of experiencing the greateſt of viciſſitudes. Ready to become the firſt power of Greece, or the theatre of the tyranny and fury of Hippias, from you alone, Callimachus, ſhe now awaits her deſtiny. If we ſuffer the ardour of the troops to cool, they will ſhamefully bow beneath the Perſian yoke; but if we lead them on to battle, the gods and victory will favour us. A word from your mouth muſt now precipitate your country into ſlavery or preſerve her liberty." Callimachus gave his ſuffrage, and the battle was reſolved. To enſure ſucceſs, Ariſtides, and the other generals after his example, yielded to Miltiades the honour of the command which belonged to them in rotation: but, to ſecure them from every hazard, he preferred waiting for the day which of right placed him at the head of the army.

When that day arrived, Miltiades drew up his troops at the foot of a mountain, on a ſpot of ground ſcattered over with trees to impede the Perſian cavalry. The Platæans were placed on the left wing; Callimachus commanded the right; Ariſtides and Themiſtocles were in the centre of the battle, and Miltiades everywhere. An interval of nearly a mile ſeparated the Grecian army from that of the Perſians. At the firſt ſignal the Greeks advanced over this ſpace running. The Perſians, aſtoniſhed at a mode of attack ſo novel to both nations, for a moment remained motionleſs; but to the impetuoſity of the enemy they ſoon oppoſed a more tranquil and not leſs formidable fury. After an obſtinate conflict of ſome hours, victory began to declare herſelf in the two wings of the Grecian army. The right diſperſed the enemy in the plain, while the left drove them back on a moraſs that had the appearance of a meadow, in which they ſtuck faſt and were loſt. Both theſe bodies of troops now flew to the ſuccour of Ariſtides and Themiſtocles, ready to give way before the flower of the Perſian troops placed by Datis in the centre of the battle. From this moment the rout became general. The Perſians, repulſed on all ſidas, found their only aſylum in the fleet which had approached the ſhore. The conquerors purſued them with fire and ſword, and took, burnt, or ſunk the greater part of their veſſels: the reſt eſcaped by dint of rowing.

The Perſian army loſt about 6400 men; that of the Athenians 192. Miltiades was wounded; Hippias was left dead on the field, as were Steſileus and Callimachus, two of the Athenian generals. Scarcely was the battle over, when a ſoldier, worn out with fatigue forms the project of carrying the firſt news of ſo ſignal a ſucceſs to the magiſtrates of Athens, and without quitting his arms, he runs, flies, arrives, announces the victory, and falls dead at their feet.

This battle was fought on the 6th of Boedromion, in the third year of the 72d Olympiad (or 29th September anno 490 B. C.) The next day 2000 Spartans arrived. In three days and nights they had marched 1200 ſtadia. Though informed of the defeat of the Perſians, they continued their march to Marathon, nor did they enviouſly ſhun to behold thoſe fields where a rival nation had ſignalized itſelf by ſo heroic an action: they there beheld the tents of the Perſians ſtill ſtanding, the plain ſtrewed over with dead, and covered with coſtly ſpoils: they there found Ariſtides, who with his tribe was guarding the priſoners and booty; and did not retire until they had beſtowed juſt applauſes on the victors.

The Athenians neglected nothing to eternize the memory of thoſe who fell in the battle. It had been uſual to inter the citizens who periſhed in war at the public expence, in the Ceramicus without the city; but the death of theſe was deemed uncommonly meritorious. They were buried, and a barrow was made for them, where their bravery had been manifeſted. Their names were engraven on little columns erected on the plain of Marathon. Theſe monuments, not excepting thoſe of the generals Callimachus and Steſileus, were in a ſtyle of the greateſt ſimplicity. In the intervals between them were erected trophies bearing the arms of the Perſians. An artiſt of eminence had painted all the circumſtances of the battle in one of the moſt frequented porticoes of the city: Miltiades was there repreſented at the head of the generals, and in the act of exhorting the troops to fight for their country.

Pauſanias examined the field of battle about 600 year-

(A) *Travels of Anacharſis;* authority, *Pauſan.* l. 79. But Dr Gillies ſeems to think that the armed ſlaves were not included in the 10,000; but amounted of themſelves to a greater number, and which formed the centre of the battle.

[illegible] for the event. His account of it is as follows: "The barrow of the Athenians is in the plain, and on it are pillars containing the names of the dead under each of the tribes to which they belonged; and there is another for the Platæans and slaves; and a distinct monument of Miltiades the commander, who survived this exploit. There may be perceived nightly the neighing of horſes and the claſhing of arms. No person has derived any good from waiting on purpoſe to behold the ſpectres; but their anger does not fall on any one who happens to ſee them without deſign. The Marathonians worſhip thoſe who were ſlain in the battle, ſtyling them *heroes*.—A trophy alſo of white marble has been erected. The Athenians ſay the Medes were buried, religion requiring that the corpſe of a man be covered with earth; though I was not able to find any place of ſepulture, for there is no barrow or other ſign viſible; but they threw them promiſcuouſly into a pit.—Above the lake are the marble mangers of the horſes of Artaphernes, with marks of a tent on the rocks."

Many centuries have elapſed ſince the age of Pauſanias; but the principal barrow, it is likely that of the gallant Athenians, ſtill towers above the level of the plain. It is of fine earth, and has a buſh or two growing on it. Dr Chandler informs us, that he enjoyed a pleaſing and ſatisfactory view from the ſummit; and looked, but in vain, for the pillars on which the names were recorded, lamenting that ſuch memorials ſhould ever be removed. At a ſmall diſtance northward is a ſquare baſement of white marble, perhaps part of the trophy. A Greek church has ſtood near it; and ſome ſtones and rubbiſh, diſpoſed ſo as to form an open place of worſhip, remain.

MARATTA. See MARHATTAS.

MARATTI, CARLO, a celebrated painter, was born at Camorano, near Ancona, in 1625. He came a poor boy to Rome, when only 11 years old; and at 12 recommended himſelf ſo effectually to Andrea Sacchi, by his drawings after Raphael in the Vatican, that he took him into his ſchool, where he continued 25 years till his maſter's death. His graceful and beautiful ideas occaſioned his being generally employed in painting madonas and female ſaints. No man ever performed in a better ſtyle, or with a greater elegance. From the fineſt ſtatues and pictures, he made himſelf maſter of the moſt perfect forms, and the moſt charming airs of heads, which he ſketched with equal eaſe and grace. He has produced a noble variety of draperies, more artfully managed, more richly ornamented, and with greater propriety, than even the beſt of the moderns. He was inimitable in adorning the heads, in the diſpoſal of the hair, and the elegance of his hands and feet, which are equal to thoſe of Raphael; and he particularly excelled in gracefulneſs. In his younger days he etched a few prints, as well of his own invention as after others, with equal ſpirit and correctneſs. It would be endleſs to recount the celebrated paintings done by this great man. Yet he executed nothing ſlightly, often changed his deſigns, and almoſt always for the better, whence his pictures were long in hand. By the example of his maſter, he made ſeveral admirable portraits of popes, cardinals, and other people of diſtinction, from whom he received the higheſt teſtimonies of eſteem, as he likewiſe did from almoſt all the monarchs and princes of Europe. Innocent XI. appointed him keeper of the paintings in his chapel and the Vatican. Maratti erected two noble monuments for Raphael and A. Caracci, at his own expence, in the Pantheon. How well he maintained the dignity of his profeſſion, appears by his anſwer to a Roman prince, who complaining of the exceſſive price of his pictures, he told him there was a vaſt debt due from the world to the famous artiſts his predeceſſors, and that he, as their rightful ſucceſſor, was come to claim thoſe arrears. His abilities in painting were accompanied with many virtues, and particularly with an extenſive charity. This great painter did at Rome in 1713, in the 88th year of his age.

MARAUDING, in a military ſenſe, means a party of ſoldiers, who, without any order, go into the neighbouring houſes and villages, when the army is either in camp or garriſon, to plunder and deſtroy, &c. Marauders are a diſgrace to the camp, to the military profeſſion, and deſerve no better quarter from their officers than they give to poor peaſants, &c.

MARAVEDI, a little Spaniſh copper coin, worth ſomewhat more than a French denier, or half a farthing Engliſh.

The Spaniards always count by maravedis, both in commerce and in their finances, though the coin itſelf is no longer current among them. Sixty-three maravedis are equivalent to a rial of ſilver; ſo that the piaſter, or piece of eight rials, contains 504; and the piſtole of four pieces of eight, 2016 maravedis.

This ſmallneſs of the coin produces vaſt numbers in the Spaniſh accounts and calculations; inſomuch that a ſtranger correſpondent would think himſelf indebted ſeveral millions for a commodity that coſt but a few pounds.

In the laws of Spain, we meet with ſeveral kinds of maravedis; Alphonſine maravedis, white maravedis, maravedis of good money, maravedis Combrenos, black maravedis, and old maravedis. When we find maravedis alone, and without any addition, it is to be underſtood of thoſe mentioned above. The reſt are different in value, fineneſs of metal, time, &c. Mariana aſſerts, that this coin is older than the Moors; that it came from the Goths; that it was anciently equal to a third part of the rial, and conſequently of 12 times the value of the preſent maravedi. Under Alphonſus XI. the maravedi was 17 times, under Henry II. ten times, under Henry III. five times, and under John II. two times and a half, the value of the preſent maravedi.

MARBELLA, a town of Andaluſia in Spain, ſituated at the mouth of the Rio Verde, 30 miles north-eaſt of Gibraltar, and 28 ſouth-weſt of Malaga. W. Long. 5. 25. N. 30. 25.

MARBLE, a calcareous ſtone, of which there are many beautiful varieties. The word comes from the French *marbre*, and from the Latin *marmor*, of the Greek μαρμαιρειν to "ſhine or glitter." See MINERALOGY *Index*.

Artificial MARBLES. The ſtucco, of which ſtatues, buſts, baſſo-relievos, and other ornaments of architecture are made, ought to be marble pulverized, mixed in a certain proportion with plaſter; the whole well ſifted, worked up with water, and uſed like common plaſter. See STUCCO.

There is alſo a kind of artificial marble made of the flaky ſelenites, or a tranſparent ſtone reſembling plaſter; which

Marble.

which becomes very hard, receives a tolerable poliſh, and may deceive a good eye. This kind of ſelenite reſembles Muſcovy talc.

There is another ſort of artificial marble formed by corroſive tinctures, which, penetrating into white marble to the depth of a line or more, imitate the various colours of other dearer marbles.

There is alſo a preparation of brimſtone in imitation of marble.

To do this, you muſt provide yourſelf with a flat and ſmooth piece of marble: on this make a border or wall, to encompaſs either a ſquare or oval table, which may be done either with wax or clay. Then having ſeveral ſorts of colours, as white lead, vermilion, lake, orpiment, maſticot, ſmalt, Pruſſian blue, &c.; melt on a ſlow fire ſome brimſtone in ſeveral glazed pipkins; put one particular ſort of colour into each, and ſtir it well together; then having before oiled the marble all over within the wall, with one colour quickly drop ſpots upon it of larger and leſs ſize; after this, take another colour and do as before, and ſo on till the ſtone is covered with ſpots of all the colours you deſign to uſe. When this is done, you are next to conſider what colour the maſs or ground of your table is to be; if of a gray colour, then take fine ſifted aſhes, and mix it up with melted brimſtone; or if red, with Engliſh red ochre; if white, with white lead; if black, with lamp or ivory black. The brimſtone for the ground muſt be pretty hot, that the colour dropt on the ſtone may unite and incorporate with it. When the ground is poured even all over, you are next, if judged neceſſary, to put a thin wainſcot board upon it: this muſt be done while the brimſtone is hot, making alſo the board hot, which ought to be thoroughly dry, in order to cauſe the brimſtone to ſtick the better to it. When the whole is cold, take it up, and poliſh it with a cloth and oil, and it will look very beautiful.

Elaſtic MARBLE, an extraordinary ſpecies of foſſil which has ſurpriſed all the naturaliſts who have ſeen it. There are ſeveral tables of it preſerved in the houſe of Prince Borgheſe at Rome, and ſhown to the curious. F. Jacquer, a celebrated mathematician, has given a deſcription in the Literary Gazette of Paris, but the naturaliſts cannot be contented with it. If permiſſion was given to make the requiſite experiments, this curious phenomenon might be better illuſtrated. "There are five or ſix tables of that marble; their length is about two feet and a half, the breadth about ten inches, and the thickneſs a little leſs than three. They were dug up, as the Abbé Fortis was told, in the feod of Mondragone; the grain is of Carrareſe marble, or perhaps of the fineſt Greek. They ſeem to have ſuffered ſome attack of fire; though the firſt degree of pulverization obſervable in the angles, can, perhaps, ſcarcely be called that of imperfect calcination. They are very dry, do not yield to external impreſſion, reſound to the hammer, like other congenerous marble, and are perhaps ſuſceptible of a poliſh. Being ſet on end, they bend oſcillating backward and forward; when laid horizontally, and raiſed at one end, they form a curve, beginning towards the middle; if placed on a table, and a piece of wood or any thing elſe is laid under them, they make a ſalient curve, and touch the table with both ends. Notwithſtanding this flexibility, they are liable to be broken if indiſcreetly handled; and therefore one table only, and that not the beſt, is ſhown to the curious. Formerly they were all together in the prince's apartment on the ground floor.

Colouring of MARBLE. This is a nice art; and in order to ſucceed in it, the pieces of marble on which the experiments are tried, muſt be well poliſhed, and free from the leaſt ſpot or vein. The harder the marble is, the better will it bear the heat neceſſary in the operation; therefore alabaſter and the common ſoft white marble are very improper for performing theſe operations upon.

Heat is always neceſſary for opening the pores of marble, ſo as to render it fit to receive the colours; but the marble muſt never be made red-hot; for then the texture of it is injured, and the colours are burnt, and loſe their beauty. Too ſmall a degree of heat is as bad as one too great; for, in this caſe, though the marble receives the colour, it will not be fixed in it, nor ſtrike deep enough. Some colours will ſtrike even cold; but they are never ſo well ſunk in as when a juſt degree of heat is uſed. The proper degree is that which, without making the marble red, will make the liquor boil upon its ſurface. The menſtruums uſed to ſtrike in the colours muſt be varied according to the nature of the colour to be uſed. A lixivium made with horſes or dogs urine, with four parts of quicklime and one of potaſhes, is excellent for ſome colours; common ley of wood-aſhes is very good for others; for ſome, ſpirit of wine is beſt; and laſtly, for others, oily liquors, or common white wine.

The colours which have been found to ſucceed beſt with the peculiar menſtruums, are theſe: Stone-blue diſſolved in ſix times the quantity of ſpirit of wine, or of the urinous lixivium, and that colour which the painters call *litmus*, diſſolved in common ley of wood-aſhes. An extract of ſaffron, and that colour made of buckthorn berries, and called by painters *ſap-green*, both ſucceed well when diſſolved in urine and quicklime; and tolerably well when diſſolved in ſpirit of wine. Vermilion, and a very fine powder of cochineal, alſo ſucceed very well in the ſame liquors. Dragon's blood ſucceeds in ſpirit of wine, as does alſo a tincture of logwood in the ſame ſpirit. Alkanet-root gives a fine colour: but the only menſtruum to be uſed for it is oil of turpentine; for neither ſpirit of wine, nor any lixivium, will do with it. There is another kind of *ſanguis draconis*, commonly called *dragon's blood in tears*, which, mixed with urine, gives a very elegant colour.

Beſides theſe mixtures of colours and menſtruums, there are other colours which muſt be laid on dry and unmixed. Theſe are, dragon's blood of the pureſt kind, for a red; gamboge for a yellow; green wax, for a green; common brimſtone, pitch, and turpentine, for a brown colour. The marble for theſe experiments muſt be made conſiderably hot, and then the colours are to be rubbed on dry in the lump. Some of theſe colours, when once given, remain immutable, others are eaſily changed or deſtroyed. Thus, the red colour given by dragon's blood, or by a decoction of logwood, will be wholly taken away by oil of tartar, and the poliſh of the marble not hurt by it.

A fine gold colour is given in the following man-ac. [illegible] crude sal ammoniac, vitriol, and verdigris, of each equal quantities. White vitriol succeeds best: and all muſt be thoroughly mixed in fine powder.

The ſtaining of marble to all the degrees of red or yellow, by ſolutions of dragon's blood or gamboge, may be done by reducing theſe gums to powder, and grinding them with the ſpirit of wine in a glaſs mortar. But, for ſmaller attempts, no method is ſo good as the mixing a little of either of thoſe powders with ſpirit of wine in a ſilver ſpoon, and holding it over burning charcoal. By this means a fine tincture will be extracted: and, with a pencil dipt in this, the fineſt traces may be made on the marble while cold; which, on the heating of it afterwards, either on ſand, or in a baker's oven, will all ſink very deep, and remain perfectly diſtinct on the ſtone. It is very eaſy to make the ground colour of the marble red or yellow by this means, and leave white veins in it. This is to be done by covering the places where the whiteneſs is to remain with ſome white paint, or even with two or three doubles only of paper; either of which will prevent the colour from penetrating. All the degrees of red are to be given to marble by this gum alone; a ſlight tincture of it, without the aſſiſtance of heat to the marble, gives only a pale fleſh colour; but the ſtronger tinctures give it yet deeper; but this the aſſiſtance of heat adds greatly; and finally, the addition of a little pitch to the tincture, gives it a tendency to blackneſs, or any degree of deep red that may be deſired.

A blue colour may be given alſo to marble by diſſolving turnſol in lixivium, in lime and urine, or in the volatile ſpirit of urine; but this has always a tendency to purple, whether made by the one or the other of theſe ways. A better blue, and uſed in an eaſier manner, is furniſhed by the Canary turnſol, a ſubſtance well known among the dyers. This needs only to be diſſolved in water, and drawn on the place with a pencil: it penetrates very deeply into the marble; and the colour may be increaſed, by drawing the pencil wetted afreſh ſeveral times over the ſame lines. This colour is ſubject to ſpread and diffuſe itſelf iregularly: but it may be kept in regular bounds, by circumſcribing its lines with beds of wax, or any ſuch ſubſtance. It is alſo to be obſerved, that this colour ſhould always be laid on cold, and no heat given even afterwards to the marble: and one great advantage of this colour is, that it is therefore eaſily added to marbles already ſtained with other colours, is a very beautiful tinge, and laſts a long time.

Arundel MARBLES, marbles with a chronicle of the city of Athens, inſcribed on them (as was ſuppoſed) many years before our Saviour's birth; preſented to the univerſity of Oxford by Thomas earl of Arundel, whence the name. See ARUNDELIAN *Marbles*.

MARBLED, ſomething veined or clouded, reſembling marble. See MARBLING.

MARBLED *China-ware*, a name given by many to a ſpecies of porcelain or china-ware, which ſeems to be full of cemented flaws. It is called by the Chineſe, who are very fond of it, *tſou tchi*. It is generally plain white, ſometimes blue, and has exactly the appearance of a piece of china which had been firſt broken, and then had all the pieces cemented in their places again, and covered with the original varniſh. The manner of preparing it is eaſy, and might be imitated with us. Inſtead of the common varniſh of the china-ware, which is made of what they call *oil of ſtone* and *oil of fern* mixed together, they cover this with a ſimple thing made only of a ſort of coarſe agates, calcined to a white powder, and ſeparated from the groſſer parts by means of water, after long grinding in mortars. When the powder has been thus prepared, it is left moiſt, or in form of a ſort of cream, with the laſt water that is ſuffered to remain in it, and this is uſed as the varniſh. Our cryſtal would ſerve full as well as thoſe coarſe agates, and the method of preparation is perfectly eaſy. The occaſion of the ſingular appearance of this ſort of porcelain is, that the varniſh never ſpreads evenly, but runs into ridges and veins. Theſe often run naturally into a ſort of moſaic work which can ſcarce be taken for the effect of chance. If the marbled china he deſired blue, they firſt give it a general coat of this colour, by dipping the veſſel into a blue varniſh; and when this is thoroughly dry, they add another coat of this agate oil.

Playing MARBLES, are moſtly imported from Holland; where it is ſaid they are made by breaking the ſtone alabaſter, or other ſubſtance, into pieces or chips, of a ſuitable ſize; theſe are put into an iron mill which turns by water: there are ſeveral partitions with raſps within, cut float-wiſe, not with teeth, which turn conſtantly round with great ſwiftneſs; the friction againſt the raſps makes them round, and as they are formed, they fall out of different holes, into which ſize or chance throws them. They are brought from Nuremberg to Rotterdam, down the Rhine, and from thence diſperſed over Europe.

MARBLING, the method of preparing and colouring the marbled paper.

There are ſeveral kinds of marbled paper; but the principal difference of them lies in the forms in which the colours are laid on the ground: ſome being diſpoſed in whirls or circumvolutions; ſome in jagged lengths; and others only in ſpots of a roundiſh or oval figure. The general manner of managing each kind is, nevertheleſs, the ſame; being the dipping the paper, in a ſolution of gum-tragacanth, or, as it is commonly called, *gum-dragon;* over which the colours, previouſly prepared with ox-gall and ſpirit of wine, are firſt ſpread.

The peculiar apparatus neceſſary for this purpoſe, is a trough for containing the gum-tragacanth and the colours; a comb for diſpoſing them in the figure uſually choſen; and a burniſhing ſtone for poliſhing the paper. The trough may be of any kind of wood; and muſt be ſomewhat larger than the ſheets of paper for marbling which it is to be employed; but the ſides of it need only riſe about two inches above the bottom; for by making it thus ſhallow, the leſs quantity of the ſolution of the gum will ſerve to fill it. The comb may be alſo of wood, and five inches in length; but ſhould have braſs teeth, which may be about two inches long, and placed at about a quarter of an inch diſtance from each other. The burniſhing ſtone may be of jaſper or agate; but as thoſe ſtones are very dear when of ſufficient largeneſs, marble or glaſs may be uſed, provided their ſurface he poliſhed to a greater degree of ſmoothneſs.

Marbling. These implements being prepared, the ſolution of gum-tragacanth muſt be made, by putting a ſufficient proportion of the gum, which ſhould be white and clear from all foulneſs, into clean water, and letting it remain there a day or two, frequently breaking the lumps and ſtirring it till the whole ſhall appear diſſolved and equally mixed with the water. The conſiſtence of the ſolution ſhould be nearly that of ſtrong gum water uſed in miniature painting; and if it appear thicker, water muſt be added; or if thinner, more of the gum. When the ſolution is thus brought to a due ſtate, it muſt be paſſed through a linen cloth; and being then put into the trough, it will be ready to receive the colours.

The colours employed for red are carmine, lake, roſe-pink, and vermilion; but the two laſt are too hard and glaring, unleſs they be mixed with roſe-pink or lake, to bring them to a ſofter caſt; and with reſpect to the carmine and lake, they are too dear for common purpoſes: for yellow, Dutch pink and yellow ochre may be employed:—for blue, Pruſſian blue and verditer may be uſed:—for green, verdigris, a mixture of Dutch pink and Pruſſian blue or verditer, in different proportions:—for orange, the orange lake, or a mixture of vermilion, or red lead, with Dutch pink: for purple, roſe-pink and Pruſſian blue.

Theſe ſeveral colours ſhould be ground with ſpirit of wine till they be of a proper fineneſs; and then, at the time of uſing them, a little fiſh-gall, or in default of it the gall of a beaſt, ſhould be added, by grinding them over again with it. The proper proportion of the gall muſt be found by trying them: for there muſt be juſt ſo much as will ſuffer the ſpots of colour, when ſprinkled on the ſolution of the gum-tragacanth, to join together, without intermixing or running into each other.

When every thing is thus prepared, the ſolution of the gum-tragacanth muſt be poured into the trough; and the colours, being in a ſeparate pot, with a pencil appropriated to each, muſt be ſprinkled on the ſurface of the ſolution, by ſhaking the pencil, charged with its proper colour over it; and this muſt be done with the ſeveral kinds of colour deſired, till the ſurface be wholly covered.

When the marbling is propoſed to be in ſpots of a ſimple form, nothing more is neceſſary; but where the whirls or ſnail-ſhell figures are wanted, they muſt be made by means of a quill; which muſt be put among the ſpots to turn them about, till the effect be produced. The jagged lengths muſt be made by means of the comb above deſcribed, which muſt be paſſed through the colours from one end of the trough to the other; and will give them that appearance: but if they be deſired to be pointed both ways, the comb muſt be again paſſed through the trough in a contrary direction; or if ſome of the whirls or ſnail-ſhell figures be required to be added, they may be yet made by the means before directed.

The paper ſhould be previouſly prepared for receiving the colours, by dipping it over-night in water; and laying the ſheets on each other with a weight over them. The whole being thus ready, the paper muſt be held by two corners, and laid in the moſt gentle and even manner on the ſolution covered with the colours; and there gently preſſed with the hand, that it may bear every where on the ſolution. After which it muſt be raiſed and taken off with the ſame care, and then hung to dry acroſs a proper cord, ſubtended near at hand for that purpoſe; and in that ſtate it muſt continue till it be perfectly dry. It then remains only to give the paper a proper poliſh: in order to which, it is firſt rubbed with a little ſoap; and then muſt be thoroughly ſmoothed by the glaſs poliſhers, ſuch as are uſed for linen, and called the *calender glaſſes*. After which it ſhould be again rubbed by a burniſher of jaſper or agate; or, in default of them, of glaſs ground to the higheſt poliſh; for on the perfect poliſh of the paper depends in a great meaſure its beauty and value.

Gold or ſilver powders may be uſed, where deſired, along with the colour; and require only the ſame treatment as them, except that they muſt be firſt tempered with gum-water.

Marbling of books or paper is performed thus: Diſſolve four ounces of gum-arabic in two quarts of fair water; then provide ſeveral colours mixed with water in pots or ſhells; and, with pencils peculiar to each colour, ſprinkle them by way of intermixture upon the gum water, which muſt be put into a trough or ſome broad veſſel: then with a ſtick curl them, or draw them out in ſtreaks, to as much variety as may be done. Having done this, hold your book or books cloſe together, and only dip the edges in, on the top of the water and colours, very lightly; which done, take them off, and the plain impreſſion of the colours in mixture will be upon the leaves; doing as well the ends as the front of the book in the like manner.

Marbling a book on the covers is performed by forming clouds with aqua-fortis or ſpirit of vitriol mixed with ink, and afterwards glazing the covers. See Book-Binding.

MARC Antonio. See Raimondi.

MARCASITE, an old term in mineralogy, given indifferently to ores, pyrites, and to ſemimetals. But more lately confined to pyrites, and to ſuch pyrites as are regularly formed. See Pyrites, Mineralogy *Index*.

MARCELLIANISM, the doctrines and opinions of the Marcellians, a ſect of ancient heretics, towards the cloſe of the ſecond century, ſo called from Marcellus of Ancyra, their leader, who was accuſed of reviving the errors of Sabellius. Some, however, are of opinion, that Marcellus was orthodox, and that they were his enemies the Arians, who fathered their errors upon him. St Epiphanius obſerves, that there was a great deal of diſpute with regard to the real tenets of Marcellus; but that, as to his followers, it is evident they did not own the three hypoſtaſes: for Marcellus conſidered the Son and Holy Ghoſt as two emanations from the divine nature, which, after performing their reſpective offices, were to return again into the ſubſtance of the Father; and this opinion is altogether incompatible with the belief of three diſtinct perſons in the Godhead.

MARCELLINUS, Ammianus. See Ammianus.

MARCELLUS, Marcus Claudius, a famous Roman general, who, after the firſt Punic war, had the management of an expedition againſt the Gauls. Here obtained the *ſpolia opima*, by killing with his own hand Viridomarus the king of the enemy. Such ſucceſs rendered him popular, and ſoon after he was intruſted to oppoſe Hannibal in Italy. He was the firſt Roman who obtained ſome advantage over this celebrated Carthaginian, and ſhowed his countrymen that Hannibal was not invincible. The troubles which were raiſed in Sicily by the Carthaginians at the death of Hieronymus, alarmed the Romans; and Marcellus, in his third conſulſhip, was ſent with a powerful force againſt Syracuſe. He attacked it by ſea and land; but his operations proved long ineffectual, and the invention and induſtry of Archimedes were able to baffle all the efforts, and to deſtroy all the great and ſtupendous machines and military engines of the Romans, during three ſucceſſive years. The perſeverance of Marcellus at laſt obtained the victory. After this conqueſt, Marcellus was called upon by his country a ſecond time to oppoſe Hannibal. In this campaign he behaved with greater vigour than before; the greateſt part of the towns of the Samnites, which had revolted, were recovered by force of arms, and 3000 of the ſoldiers of Hannibal made priſoners. Some time after, in an engagement with the Carthaginian general, Marcellus had the diſadvantage: but on the morrow a more ſucceſsful ſkirmiſh vindicated his military character and the honour of the Roman ſoldiers. Marcellus, however was not ſufficiently vigilant againſt the ſnares of his adverſary. He imprudently ſeparated himſelf from his camp, and was killed in an ambuſcade, in the 60th year of his age, in his 5th conſulſhip, A. U. C. 544. His body was honoured by the conqueror with a magnificent funeral, and his aſhes were conveyed in a ſilver urn to his ſon. Marcellus claims our commendation for his private as well as public virtues; and the humanity of a general will ever be remembered, who, at the ſurrender of Syracuſe, wept on the thought that many were going to be expoſed to the avarice and rapacioufneſs of an incenſed ſoldiery, which the policy of Rome and the laws of war rendered inevitable.

MARCGRAVE, or MARGRAVE, a kind of dignity in Germany, anſwering to our marquis; (ſee MARQUIS). The word is derived from the German *Marche*, or *Marcke*, which ſignifies "a frontier;" and *Graffe*, "count, governor;" *Marcgraves* being originally governors of cities lying on the frontiers of a country or ſtate.

MARCH, (*Martius*), the third month of the year, according to the common way of computing. See MONTH, and YEAR.

Among the Romans, March was the firſt month; and in ſome eccleſiaſtical computations, that order is ſtill preſerved; as particularly reckoning the number of years from the incarnation of our Saviour; that is, from the 25th of March.

It was Romulus who divided the year into months; to the firſt of which he gave the name of his ſuppoſed father *Mars*. Ovid, however, obſerves, that the people of Italy had the month of March before Romulus's time; but that they placed it very differently, ſome making it the third, ſome the fourth, ſome the fifth, and others the tenth month of the year.

In this month it was that the Romans ſacrificed to Anna Perenna; that they began their comitia; that they adjudged their public farms and leaſes; that the miſtreſſes ſerved the ſlaves and ſervants at table, as the maſters did in the Saturnalia; and that the veſtals renewed the ſacred fire.

The month of March was always under the protection of Minerva, and always conſiſted of 31 days.—The ancients held it an unhappy month for marriage, as well as the month of May.

March

MARCH, in the military art, is the moving of a body of men from one place to another. Nothing is laid down particularly concerning the marches of the Jewiſh armies; only thus much we may collect, that they made uſe of trumpets, to the different ſounds of which they prepared themſelves by packing up their baggage, putting themſelves in readineſs, and attending at the ſtandards, to wait the ſignal for marching. We are told that the army of the Iſraelites marched in general no more than one league in a day and a half; but this appears to hold good only of their progreſs through difficult roads: For Follard ſays they might, in an open country, march four leagues in a day or more. The Rabbins ſuppoſe that the Iſraelites marched in the ſame order they were placed in their camp. The Greeks, let the poſture of their affairs be what it would, never marched againſt their enemies till favourable omens encouraged the enterpriſe. An eclipſe of the moon, or any untoward accident, or the intervening of what they eſteemed an unlucky day, entirely prevented their march. But of all the Greeks the Lacedemonians were the moſt nice and ſcrupulous. The heavenly bodies directed all their motions; and it was an invariable maxim with them never to march before the full moon. The Greeks are particularly remarked by Homer for marching in good order and profound ſilence; whereas the Barbarian forces were all noiſe, clamour, and confuſion. It is needleſs to ſay any thing concerning the marches of the Roman armies, more than that they were performed with the greateſt order and deſpatch, inſomuch that their unexpected preſence frequently damped the ſpirits of their enemies. The Roman ſoldiers were inured to the military pace, that is, to walk 20 miles in five hours, though at the ſame time they carried burdens of 60 pounds weight.

Of all the mechanical parts of war, in modern times, none is more eſſential than that of marching. It may be juſtly called the *key* which leads to all future motions and manœuvres of an army; for they depend entirely on this point. A man can be attacked in four different ways; in the front, on both flanks, and in the rear: but he can defend himſelf, and annoy the enemy, only when placed with his face towards him. Hence it follows, that the general object of marching is reduced to three points only; to march forwards, and on both ſides, becauſe it is impoſſible to do it for any time backwards, and by that means face the enemy wherever he preſents himſelf.—The different ſteps to be made uſe of are three: ſlow, faſt, and oblique. The firſt is proper in advancing, when at a conſiderable diſtance from the enemy, and when the ground is unequal, that the line may not be broke, and a regular fire kept up without intermiſſion. The ſecond is chiefly neceſſary when you want to anticipate the enemy in occupying ſome poſt, in paſſing a defile, and, above all, in attacking an intrenchment, to avoid being a long while expoſed to the fire of the artillery and ſmall arms, &c. The third ſtep is of infinite conſequence, both in the infantry and cavalry; columns may be opened and formed into lines, and *vice verſa*, lines into columns, by this kind of ſtep, in a leſſer ſpace, and conſequently in leſs time, than by any other method whatſoever. In coming out of a defile, you may inſtantly form the line without preſenting the flank to the enemy. The line may be formed, though ever ſo near to the enemy, with ſafety; becauſe you face him, and can with eaſe and ſafety protect and cover the motion of the troops, while they are coming out of the defiles, and forming. The ſame thing may be equally executed, when a column is to be formed in order to advance or retreat; which is a point of infinite conſequence, and ſhould be eſtabliſhed as an axiom.

The order of march of the troops muſt be ſo diſpoſed, that each ſhould arrive at their rendezvous, if poſſible, on the ſame day. The quarter-maſter-general, or his deputy, with an able engineer, ſhould ſufficiently reconnoitre the country, to obtain a perfect knowledge of it and the enemy, before he forms his routes.

Before a march, the army generally receives ſeveral days bread. The quarter-maſters, camp colour-men, and pioneers, parade according to orders, and march immediately after, commanded by the quarter-maſter-general or his deputy. They are to clear the roads, level the ways, make preparation for the march of the army, &c. The *general*, for inſtance, beats at two, the *aſſembly* at three, and the army to march in 20 minutes after. Upon beating the *general*, the village, and general officer's guards, quarter and rear guards, join their reſpective corps; and the army pack up their baggage. Upon beating the *aſſembly*, the tents are to be ſtruck, and ſent with the baggage to the place appointed, &c.

The companies draw up in their ſeveral ſtreets, and the rolls are called. At the time appointed, the drummers are to beat a march, and fifers play at the head of the line, upon which the companies march out from their ſeveral ſtreets, form battalions, as they advance to the head of line, and then halt.

The ſeveral battalions will be formed into columns by the adjutant-general, and the order of march, &c. be given to the general officers who lead the columns.

The cavalry generally march by regiments or ſquadrons. The heavy artillery always keeps the great roads in the centre of the columns, eſcorted by a ſtrong party of infantry and cavalry. The field pieces march with the columns.

Each ſoldier generally marches with 36 rounds of powder and ball, and two good flints; one of which is to be fixed in the cock of his firelock. The routes muſt be formed ſo that no columns croſs one another on the march.

MARCHAND, PROFESSOR, was from his youth brought up at Paris in the profeſſion of a bookſeller, and in the knowledge of books. He kept a regular correſpondence with ſeveral learned men, among whom was Bernard the continuator of the *Nouvelles de la Republique des Lettres*, and furniſhed this writer with the literary anecdotes of France. Marchand, having embraced the Proteſtant religion, went to join Bernard in Holland, where he might be at liberty to profeſs his religious opinions. He continued the trade of bookſeller for ſome time; but afterwards quitted it, that he might dedicate himſelf wholly to the purſuits of literature. The hiſtory of France, together with a knowledge of books and authors, was always his favourite ſtudy. In the latter he was ſo eminently diſtinguiſhed, that he was conſulted from all parts of Europe. He was alſo one of the principal authors of the *Journal Litteraire*, one of the beſt periodical works which have appeared in Holland; and he furniſhed excellent extracts for the other journals. This valuable and learned man died at an advanced age, the 14th of June 1756; and left the little fortune which he had to a ſociety inſtituted at the Hague, for the education and inſtruction of a certain number of poor people. His library, which was excellently choſen for literary hiſtory, together with his manuſcripts, was left by his will to the univerſity of Leyden. From him we have, 1. The Hiſtory of Printing, a new edition of which has been promiſed by one of his friends. This work, which is full of notes and critical diſcuſſions, appeared in 1740 at the Hague, in 4to. There is ſuch a prodigious diſplay of erudition, and remarks and quotations are heaped together in ſuch confuſion, that when you get to the end of the chaos, you know not what concluſion to form concerning the points which have been diſcuſſed. Abbé Mercier, abbot of Saint Leger de Soiſſons, gave in 1775, 4to, a ſupplement to this hiſtory, which is equally curious and accurate. 2. An Hiſtorical Dictionary, or Memoirs Critical and Literary, printed at the Hague in 1758, in two ſmall volumes, folio. In this work we meet with hiſtorical ſingularities, literary anecdotes, and a diſcuſſion of points of bibliography; but too great minuteneſs prevails in it, the ſtyle is deficient in point of purity, and the author is too much carried away by the heat and eagerneſs of his character. More erudition could not well be collected; eſpecially upon ſubjects which, at leaſt to the generality of readers, are ſo unintereſting. 3. A new edition of Bayle's Dictionary, and Letters of the *Cymbalum mundi*, &c.

Marches.

MARCHANTIA, a genus of the natural order of algæ, belonging to the cryptogamia claſs of plants. See BOTANY *Index*.

MARCHE, a province of France, bounded on the north by Berry, on the eaſt by Auvergne, on the weſt by Angoumois, and on the ſouth by Limoſin. It is about 55 miles in length, and 25 in breadth, and is pretty fertile in corn and wine.

MARCHENA, a handſome, ancient, and conſiderable town of Spain, in Andaluſia, with the title of a duchy, and a ſuburb as large as the town, ſeated in the middle of a plain, particularly fertile in olives, though very deſtitute of water. W. Long. 5. 20. N. Lat. 37. 20.

MARCHERS, or LORDS-MARCHERS, were thoſe noblemen that lived on the marches of Wales or Scotland; who, in times paſt, according to Camden, had their laws, and *poteſtatem vitæ*, &c. like petty kings, which are aboliſhed by the ſtat. 27 Hen. VIII. c. 26. and 1 Edw. VI. c. 10. In old records the lords marchers of Wales were ſtyled *Marchiones de Marchia Walliæ*. See 1 et 2 P. et M. c. 15.

MARCHES (*marchia*), from the German *march*, i. e.

Marches. i.e. limits or bounds, from the French marche, viz. *signum* (a sign or mark set up as a distinction between two countries or territories), are the limits between England and Wales, or between England and Scotland, which last are divided into west and middle marches. 4 Hen. V. c. 7. 22 Ed. IV. c. 8. 24 Hen. VIII c. 9. And there was formerly a court called the *court of the marches of Wales*, where pleas of debt or damages, not above the value of 50 pounds, were tried and determined; and if the council of the marches held plea for debts above that ſum, &c. a prohibition might be awarded. Hill. 14 Car. I. Cro. Car 38.

MARCHET, or MARCHETTA, a pecuniary fine, anciently paid by the tenant to his lord, for the marriage of one of the tenant's daughters. This cuſtom obtained, with ſome difference, throughout all England and Wales, as alſo in Scotland; and it ſtill continues to obtain in ſome places. According to the cuſtom of the manor of Dinover in Caermarthenſhire, every tenant at the marriage of his daughter pays ten ſhillings to the lord; which, in the Britiſh language, is called *gwabr-merched*, i. e. *maid's fee.*

In Scotland, and the north parts of England, the cuſtom was, for the lord to lie the firſt night with the bride of his tenant; but this uſage was abrogated by King Malcolm III. at the inſtance of his queen; and, inſtead thereof, a mark was paid by the bridegroom to the lord: whence is was called *marchetta mulieris.* See BOROUGH *English.*

MARCIANA SILVA, in *Ancient Geography*, a foreſt ſituated between the Rauraci and the Danube, before it comes to be navigable; a part of the Hercynia. Now Schwartzwald, or *Black Foreſt*, in the ſouth-weſt of Suabia, near the riſe of the Danube and Neckar.

MARCIANUS, a native of Thrace, born of an obſcure family. After he had for ſome time ſerved in the army as a common ſoldier. he was made private ſecretary to one of the officers of Theodoſius. His winning addreſs and uncommon talents raiſed him to higher ſtations; and on the death of Theodoſius II. A. D. 450, he was inveſted with the imperial purple in the eaſt. The ſubjects of the Roman empire had reaſon to be ſatisfied with their choice. Marcianus ſhowed himſelf active and reſolute; and when Attila, the barbarous king of the Huns, aſked of the emperor the annual tribute, which the indolence and cowardice of his predeceſſors had regularly paid, the ſucceſſor of Theodoſius firmly ſaid, that he kept his gold for his friends, but that iron was the metal which he had prepared for his enemies. In the midſt of univerſal popularity, Marcianus died, after a reign of ſix years, in the 69th year of his age, as he was making warlike preparations againſt the barbarians that had invaded Africa. His death was long lamented; and indeed his merit was great, ſince his reign has been diſtinguiſhed by the appellation of the Golden Age. Marcianus married Pulcheria the ſiſter of his predeceſſor. It is ſaid, that in the years of his obſcurity he found a man who had been murdered, and that he had the humanity to give him a private burial; for which circumſtance he was accuſed of the homicide, and impriſoned. He was condemned to loſe his life; and the ſentence would have been executed, had not the real murderer been diſcovered, and convinced the world of the innocence of Marcianus.——Another emperor of the eaſt, A. D. 479 &c.

Marco-manni.

MARCIONITES, or MARCIONISTS, *Marcioniſtæ*, a very ancient and popular ſect of heretics, who, in the time of St Epiphanius, were ſpread over Italy, Egypt, Paleſtine, Syria, Arabia, Perſia, and other countries: they were thus denominated from their author Marcion. Marcion was of Pontus, the ſon of a biſhop, and at firſt made profeſſion of the monaſtical life; but he was excommunicated by his own father, who would never admit him again into the communion of the church, not even on his repentance. On this he abandoned his own country, and retired to Rome, where he began to broach his doctrines.

He laid down two principles, the one good, the other evil: between theſe he imagined an intermediate kind of deity of a mixed nature, who was the creator of this inferior world, and the god and legiſlator of the Jewiſh nation: the other nations, who worſhipped a variety of gods, were ſuppoſed to be under the empire of the evil principle These two conflicting powers exerciſe oppreſſions upon rational and immortal ſouls; and therefore the ſupreme God, to deliver them from bondage, ſent to the Jews a being more like unto himſelf, even his ſon Jeſus Chriſt, clothed with a certain ſhadowy reſemblance of a body: this celeſtial meſſenger was attacked by the prince of darkneſs, and by the god of the Jews, but without effect. Thoſe who follow the directions of this celeſtial conductor, mortify the body by faſtings and auſterities, and renounce the precepts of the god of the Jews and of the prince of darkneſs, ſhall after death aſcend to the manſions of felicity and perfection. The rule of manners which Marcion preſcribed to his followers was exceſſively auſtere, containing an expreſs prohibition of wedlock, wine, fleſh, and all the external comforts of life.

Marcion denied the real birth, incarnation, and paſſion of Jeſus Chriſt, and held them to be all apparent only. He denied the reſurrection of the body; and allowed none to be baptized but thoſe who preſerved their continence; but theſe, he granted, might be baptized three times. In many things he followed the ſentiments of the heretic Cerdon, and rejected the law and the prophets. He pretended the goſpel had been corrupted by falſe prophets, and allowed none of the evangeliſts but St Luke, whom alſo he altered in many places as well as the epiſtles of St Paul, a great many things in which he threw out. In his own copy of St Luke he threw out the two firſt chapters entire.

MARCITES, MARCITÆ, a ſect of heretics in the ſecond century, who alſo called themſelves the *perfecti*, and made profeſſion of doing every thing with a great deal of liberty and without any fear. This doctrine they borrowed from Simon Magus, who however was not their chief; for they were called *Marcites* from one Marcus, who conferred the prieſthood, and the adminiſtration of the ſacraments, on women.

MARCO POLO, PAOLO, or *Paul*. See PAULO.

MARCOMANNI, an ancient people of Germany, who ſeem to have taken their name from their ſituation on the limits or marches, to the eaſt of the Higher Rhine, and the north of the Danube. Cluverius allots to them the duchy of Wurtemburg, a part of the palatinate between the Rhine and the Necker, the Briſgau, and a part of Suabia, lying between the ſprings of the Danube and the river Bregentz: they afterwards removed to the country of the Boii, whom they expelled and forced to withdraw more to the eaſt, occupying what is now called *Bohemia*. (Strabo, Velleius.)

MARCOSIANS, or Colobarsians, an ancient ſect in the church, making a branch of the Valentinians.

St Irenæus ſpeaks at large of the leader of this ſect, Marcus, who it ſeems was reputed a great magician. The Marcoſians had a great number of apocryphal books which they held for canonical, and of the ſame authority with ours. Out of theſe they picked ſeveral idle fables touching the infancy of Jeſus Chriſt, which they put off for true hiſtories. Many of theſe fables are ſtill in uſe and credit among the Greek monks.

MARCULUS, among the Romans, a knocker or inſtrument of iron to knock at doors with.

MARCUS Aurelius Antoninus. See Antoninus.

MARDIKERS, or Topasses, a mixed breed of Dutch, Portugueſe, Indians, and other nations, incorporated with the Dutch at Batavia, in the Eaſt Indies.

MARE, the female of the horſe kind. See Equus, Mammalia *Index*, and Horse.

MAREOTIS, a lake in Egypt near Alexandria. Its neighbourhood was famous for wine, though according to ſome the *Mareoticum vinum* is the produce of Epirus, or of a certain part of Libya, called alſo *Mareotis*, near Egypt.

MARETS, Jean de, a Pariſian, one of the fineſt geniuſes of the 17th century, became at laſt a viſionary and a fanatic. He was a great favourite of Cardinal Richelieu, and poſſeſſed an employment of genius under him; for he was called upon to relax and divert him, after the fatigue of buſineſs by facetious converſation. He uſed, in order to triumph over the virtue of women, when they objected to him the intereſt of their ſalvation, to lead them into atheiſtical principles. He was a member of the French academy from its firſt erection. He wrote ſeveral dramatic pieces, which were well received. He attempted an epic poem; but after ſpending ſeveral years about it, dropped the deſign to write books of devotion. He likewiſe wrote romances; but not ſuch virtuous ones as uſed to be written at that time. He was a declared enemy of the Janſeniſts. His viſions are well deſcribed by the Meſſieurs de Port Royal. He promiſed the king of France, by the explication of prophecies, the honour of overthrowing the Mahometan empire, and every ſpecies of what he was pleaſed to denominate hereſy, bringing the whole world to the profeſſion of the true faith. This he ſaid Louis XIV. was to accompliſh at the head of 144,000 elect. Extravagant and abſurd as theſe declarations were, he was, notwithſtanding, admired and patroniſed by ſome of the biſhops; and though a layman, he was permitted to vent his reveries in religious houſes, and aſſume the direction of devotees of both ſexes. He maintained his credit with the great to the very laſt, and died in 1676, at the age of 81. In his laſt years he wrote ſomething againſt Boileau's Satires.

Marets, *Samuel de*, one of the moſt celebrated divines of the reformed church, was born in Picardy, in 1599. In 1620, he was ſettled in the church of Laon; but, in 1624, accepted a call to that of Sedan, to ſucceed James Cappel in the office of paſtor and profeſſor of divinity. Having ſoon after obtained leave of abſence from his flock, he viſited Holland, where he was admitted to the degree of doctor of divinity at Leyden, in 1625. From Holland he took a voyage to England, and after a ſhort ſtay in that country he returned to Sedan, where he commenced his labours in the divinity chair. There he continued for about ſeven years with reputation to himſelf, but not without being ſometimes involved in troubles, which he bore with a commendable reſolution.

In 1631 he was made chaplain to the army of the duke de Bouillon in Holland; but that nobleman having married a Roman Catholic lady, M. de Marets adviſed him to adhere ſteadily to the proteſtant faith, on which account he incurred the diſpleaſure of the ducheſs. Thus circumſtanced, he received in 1636, an invitation to become paſtor to the church of Boiſleduc, with which he complied, and in the following year he was appointed profeſſor of the *ſchola illuſtris* of the ſame city. The duties of this office he diſcharged with ſuch diligence and ſucceſs, that in 1640, the curators of the univerſity of Franeker ſent him the offer of a profeſſorſhip, which he declined; but two years after he accepted a ſimilar offer from the univerſity of Groningen, to which his ſervices were devoted for upwards of thirty years. In 1652 he was made ſole miniſter of the Walloon church at Groningen, where till that time he had gratuitouſly preached once every Sunday, to aſſiſt the paſtor. Influenced by the fame of his extraordinary merits, the magiſtrates of Berne in 1661 offered him the chair of profeſſor of divinity at Lauſanne, with conſiderable emoluments, but he declined this offer; and his death happened before he took poſſeſſion of a ſimilar charge at Leyden, of which he had accepted. His Syſtem of Divinity was found to be ſo methodical, that it was made uſe of at other academies; and at the end of it may be found a chronological table of all his works. Their number is prodigious; and their variety ſhows the extent of his genius. He was moreover engaged in many diſputes and controverſies, and died in 1673.

MARGARET, St, a celebrated virgin, who, as is ſuppoſed, received the crown of martyrdom at Antioch in the year 275: the manner of her death is not known. The ancient martyrologiſts make no mention of her name, and ſhe did not become famous till the 11th century. There is no more foundation for what is ſaid concerning her relics and girdles than for the ſtories which are told of her life. A feſtival, however, is ſtill held in honour of her memory on the 20th of July: See *Baillet's Lives of the Saints*, for that day. "Her actions (ſays this authority) have been ſo falſified and altered, in the opinion even of Metaphraſtus, that the Romiſh church have not thought proper to inſert any of them into their breviary. The Orientals pay reverence to her by the name of *Saint Pelagia* or *Saint Marina*, and the weſtern church by that of *Saint Geruma* or *Saint Margaret*.

Margaret, the daughter and heireſs of Florent count of Holland, who is famous on account of a ſtory repeated by a hundred compilers even of the 18th century. Having refuſed charity to a woman whom ſhe at the ſame time accuſed of adultery, ſhe was a puniſhment from God, brought to bed (A. D. 1276), of 365 children, partly boys and partly girls. The boys, it is added, were all named *John*, and the girls *Elizabeth*. This ſtory is repreſented in a large painting in a village not far from the Hague; and by the ſide of the painting are ſeen two large baſons of braſs, on which it is pretended the 365 children were preſented to be baptized. But if a picture is a ſufficient authority for the truth of any thing, it is impoſſible to tell how many fables would be fully atteſted. It has been remarked, that the moſt ancient annals are altogether ſilent concerning this fact; and that it is related only by modern writers, who beſides do not agree with one another concerning either the date of time, or the life of the counteſs, or the number of the children; and in ſhort, that Naſſau, who was at that time biſhop of Utrecht, was called *John*, and not *Gui*, as the chronicles declare. Several learned men have endeavoured to trace the cauſe which could have given riſe to a relation ſo extraordinary. M. Struik fixed upon the epitaphs of the mother and ſon, which appeared to him worthy of ſome attention; and, in conformity to the dates which they bear, he ſuppoſed that the counteſs was brought to bed on Good Friday 1276, which was the 26th of March. Now, as the year then began on the 25th of the ſame month, there were only two days of the year elapſed when the counteſs was brought to bed, which circumſtance cauſed it to be ſaid *that ſhe had brought into the world as many children as there were days in the year*. In fact only two children are mentioned in hiſtory, John and Elizabeth. The fable thus explained is only a common event, wherein there is nothing of the marvellous, but in conſequence of a double meaning in the expreſſion. Later writers, who have not examined this circumſtance, have aſcribed 365 children to the counteſs. *Journal des Sçavans*, February, 1758, on the General Hiſtory of the United Provinces.

MARGARET, *Counteſs of Richmond and Derby*, the learned and pious mother of Henry VII. was born at Betſhoe in Bedfordſhire, in 1441; and was the ſole heireſs of John Beaufort duke of Somerſet, grandſon to John of Gaunt. Her mother was the heireſs of Lord Beauchamp of Powick. Whilſt yet very young, the great duke of Suffolk, miniſter to Henry VI. or rather to Queen Margaret, ſought her in marriage to his ſon; and ſhe was at the ſame time ſolicited by the king for his half brother Edmund earl of Richmond. To the latter ſhe gave her hand. Henry VII. was the ſole fruit of this marriage, his father dying when he was but 15 weeks old. Her ſecond huſband was Sir Henry Stafford, knight, ſecond ſon to the duke of Buckingham; by whom ſhe had no iſſue. Soon after his death, which happened in the year 1482, ſhe ſought conſolation in a third huſband, Thomas Lord Stanley, who, in the firſt year of her ſon's reign, was created earl of Derby. He died in the year 1504, without iſſue, being then high conſtable of England. She ſurvived her lord not quite five years, dying at Weſtminſter in June 1509, in the 69th year of her age. She was buried in Henry VII.'s chapel; on the ſouth ſide of which was erected to her memory an altar-tomb of black marble, with her ſtatue of braſs. From her funeral ſermon preached by her confeſſor Biſhop Fiſher, who, ſays Ballard, knew the very ſecrets of her ſoul, we learn, "that ſhe poſſeſſed almoſt all things that were commendable in a woman, either in mind or body." She underſtood the French language perfectly, and had ſome knowledge of the Latin. She was devout even to auſterity, in humility romantic, profuſe in the encouragement of learning, and ſingularly chaſte; but this laſt virtue became conſpicuous only towards the latter end of a third marriage. "In her laſt huſband's days (ſays Baker), ſhe obtained a licence of him to live chaſte, whereupon ſhe took upon her the vow of celibacy." 'A boon (ſays Mr Walpole), as ſeldom requeſted, I believe of a third huſband, as it probably would be eaſily granted.' Her life, from the turbulence of the times, and viciſſitude of her ſon's fortune, muſt neceſſarily have been ſubject to infinite diſquiet, which however ſhe is ſaid to have ſupported with ſingular fortitude. She wrote, 1. The Mirroure of Golde for the ſinful ſoule, tranſlated from a French tranſlation of a book called *Speculum aureum peccatorum*. Emprynted at London, in Flete-ſtrete, at the ſigne of St George, by Richard Pynſon, quarto, with cuts on vellum. 2. Tranſlation of the fourth book of Dr Gerſen's Treatiſe of the Imitation and following the bleſſed Life of our moſt merciful Saviour Chriſt. Printed at the end of Dr William Atkinſon's Engliſh tranſlation of the three firſt books, 1504. 3. A letter to the king: in Howard's collection. 4. By her ſon's order and authority, ſhe alſo made the orders for great eſtates of ladies and noble women, for their precedence, and wearing of barbes at funerals, over the chin and under the ſame.

MARGARET, the daughter of Woldemar III. king of Denmark, ſtyled the *Semiramis of the North;* ſhe ſucceeded her father in the throne of Denmark, her huſband in that of Norway; and the crown of Sweden was given her as a recompenſe for delivering the Swedes from the tyranny of Albert their king. Thus poſſeſſed of the three kingdoms, ſhe formed the grand political deſign of a perpetual union, which ſhe accompliſhed, *pro tempore* only, by the famous treaty ſtyled the *union of Calmar*. She died in 1412, aged 59.

MARGARET of Anjou, daughter of René d'Anjou, king of Naples, and wife of Henry VI. king of England: an ambitious, enterpriſing, courageous woman. Intrepid in the field, ſhe ſignalized herſelf by heading her troops in ſeveral battles againſt the houſe of York; and if ſhe had not been the authoreſs of her huſband's misfortunes, by putting to death the duke of Glouceſter his uncle, her name would have been immortalized for the fortitude, activity, and policy with which ſhe ſupported the rights of her huſband and ſon, till the fatal defeat at Tewkſbury; which put an end to all her enterpriſes, the king being taken priſoner, and Prince Edward their only ſon baſely murdered by Richard duke of York. Margaret was ranſomed by her father, and died in Anjou in 1482. See ENGLAND, N° 201—226.

MARGARET, *Ducheſs of Newcaſtle.* See CAVENDISH.

MARGARITA, or PEARL-ISLAND, an iſland of South America, the middle of which is ſeated in W.

Long. 64. 2. N. Lat. 11. 30. It was diſcovered by Columbus, and is about 35 leagues in compaſs. The ſoil is very fertile in maize and fruits, and abounds in paſture and verdant groves; yet is totally deſtitute of freſh water, which the inhabitants are obliged to bring from the continent. When the Spaniards firſt landed here, they found the natives buſy in fiſhing for oyſters. Columbus ordered ſome of the ſavages aboard his ſhip, who were ſo far from being terrified, that they very ſoon became familiar with the Spaniards. The latter at firſt imagined that the oyſters ſerved them for food; but on opening the ſhells, they found they contained valuable pearls. Upon this diſcovery they immediately landed, and found the natives ready to part with their pearls for the mereſt trifles. In proceſs of time the Spaniards built a caſtle, called *Monpadre*, and employed prodigious numbers of Guinea and Angola negroes in the pearl fiſhery; cruelly forcing them to tear up the oyſters from the rocks to which they ſtuck, during which time many of them were deſtroyed by the ſharks and other voracious fiſhes. In 1620, this iſland was invaded by the Dutch, who demoliſhed the caſtle upon it: ſince which time it has been in a manner abandoned by the Spaniards; and is now principally inhabited by the natives, to whom ſome particular indulgences were granted by the court of Spain, on account of their ready ſubmiſſion to Columbus.

MARGARITA, the *Pearl*, in *Natural Hiſtory*. See PEARL and MYA.

MARGARITINI, are glaſs ornaments, made at Venice, of ſmall glaſs tubes of different colours, which are blown at Murano, and which the women of the lower claſs wear about their arms and necks. The largeſt ſort are uſed for making roſaries. This work is performed with great diſpatch, the artiſan taking a whole handful of theſe tubes at once, and breaking them off one after another with an iron tool. Theſe ſhort cylinders are mixed with a kind of aſhes, and put over the fire in an iron pan; and when the two ends begin to melt, by ſtirring them about with an iron wire, they are brought to a round figure; but care is taken not to leave them too long over the fire, leſt the hole through which they are to be ſtrung ſhould be entirely cloſed by the melting of the glaſs. There are ſeveral ſtreets at Franceſco de Vigna entirely inhabited by people whoſe ſole occupation is to make and ſtring theſe margaritini.

MARGATE, a ſea-port town of Kent, on the north ſide of the iſle of Thanet, near the North Foreland. It is noted for ſhipping vaſt quantities of corn (moſt, if not all, the product of that iſland) for London; and has a ſalt-water bath at the poſt-houſe, which has performed great cures in nervous and paralytic caſes, and numbneſs of the limbs. It lies in St John's pariſh, which is a member of the port of Dover, at the diſtance of 14 miles, 12 from Canterbury, and 72 from London; and in the ſummer ſeaſon is frequented for ſea-bathing, having become one of the principal watering places for the idle, the opulent, and the invalid, where they meet with every requiſite accommodation; and the adjacent country abounds with moſt extenſive proſpects and pleaſant rides. E. Long. 1. 30. N. Lat. 51. 24.

MARHATTAS, MERHATTAHS, MARATTAS, or MAHRATTAS; a people of India, and by far the moſt conſiderable of all the Hindoo powers. The Marhattas boaſt a very high antiquity; they profeſs the religion of Brama; ſpeak a dialect of the Sanſcrit language, in which they have introduced all the technical terms of Mogul adminiſtration; uſe a character of their own in writing, though not very different from ſome of the other tribes around them; and are divided into four caſts or claſſes of people, with the various ſubdiviſions of profeſſional diſtinction found over the reſt of Hindoſtan; but with this remarkable difference, that among the Marhattas every individual may, as in fact he occaſionally does, follow the life of a ſoldier.

As a nation inhabiting immemorially the country properly denominated *Marhat* or *Merhat*, and comprehending the greater part of the Paiſhwa's preſent dominions in the Decan, they were completely ſubjugated, and afterwards for many centuries depreſſed, firſt by the Patans, then by the Mogul conquerors of Delhi. At length, towards the end of Alemgeer's reign, they united, rebelled, and under the famous *Sewajee* or *Seeva-jee*, a leader of their own tribe, laid the foundations of their preſent vaſt empire, which has riſen gradually on the ruins of the Mohamedan power, as related under the article HINDOSTAN.

Seeva-jee was ſucceeded by his ſon Rajah Sahou, who conſiderably extended the Marhatta dominions. When Rajah Sahou grew old and infirm, and the fatigues of government began to preſs heavy upon him, he appointed Biſſonat Balajee, a Brahman born at Gokum, and leader of about 25,000 horſe, to the office of Paiſhwa or vicegerent.

Rajah Sahou died without iſſue, but left nephews by his brother. The courage and wiſdom of Balajee had gained him, during the latter years of the old rajah, the affection and eſteem of all the nation. But, under an appearance of modeſty and ſelf-denial, his prevailing paſſion was ambition; and the ſentiments of gratitude and loyalty were abſorbed in the deſire to command. He made uſe of the influence he had acquired under his benefactor ſo firmly to eſtabliſh his own power, that he not only retained the high office of Paiſhwa during his life, but tranſmitted it to his poſterity. The Marhattas, gradually forgetting a prince they knew nothing of, became accuſtomed to obey his vicegerent only: yet a certain reſpect for the royal race, or the dread of the conſequence of violating the ſtrong prejudice which the nation ſtill retains in favour of the family of its founder, have ſerved perhaps to preſerve it; and the deſcendants of Rajah Sahou's nephews yet exiſt, but are kept in captivity in the palace at Sattarah. The eldeſt is ſtyled Ram Rajah, or ſovereign; his name is on the ſeal and coin of the Marhatta ſtate; but his perſon is unknown, except to thoſe who immediately ſurround him. He reſides in his ſplendid priſon, encompaſſed with the appendages of eaſtern grandeur, but debarred of all power, and kept totally ignorant of buſineſs. The ſeat of government was transferred from the ancient royal reſidence of Sattarah to Poonah; and the uſurper, as well as his ſucceſſors, ſeem ſtill to have acted under the ſuppoſed authority of the depoſed prince, by their aſſuming no other title or character than that of Paiſhwa or prime miniſter. From this time, the government of the Ram Rajah has been diſtinguiſhed only by the appellation of the *Paiſhwaſhip*, or otherwiſe the *Government of Poonah*, from the name of its preſent capital.

Biſſonat Balajee was ſucceeded as Paiſhwa by his eldeſt ſon, Balajee Row, (called alſo *Nana Saheb*, or *Nanna Row*), who left three ſons, the eldeſt of whom, Balajee Pundit, ſometimes called Nanah Pundit, ſucceeded him. The two others were Rogobah or Ragonat Row, and Shamſheer Row.

Balajee Pundit left two ſons; Mahadava Row, who was Paiſhwa twelve years; and Narrain Row, who ſucceeded him.

During the latter part of the life of Mahadava Row, his uncle Rogobah was confined to the palace at Poonah, for reaſons with which we are not acquainted. Mahadava Row died without iſſue: and upon the acceſſion of Narrain his brother, a youth of about 19 years of age, Rogobah in vain applied to be releaſed from his confinement. He is therefore ſuſpected of having entered into a conſpiracy with two officers in his nephew's ſervice, Somair Sing and Yuſuph Gardie, in order to procure that by force which he could not obtain by entreaty. The correſpondence between the conſpirators was carried on with ſo much ſecrecy, that the court had not the leaſt intimation or ſuſpicion of their deſign, till every avenue leading to the palace had been ſecured, and the whole building ſurrounded by the troops under the command of thoſe two officers. It is ſaid, that on the firſt alarm, Narrain Row, ſuſpecting his uncle, ran to his apartment, threw himſelf at his feet, and implored his protection: "You are my uncle (ſaid he), ſpare the blood of your own family, and take poſſeſſion of a government which I am willing to reſign to you."

Somair and Yuſuph entered the room whilſt the young Paiſhwa was in this ſuppliant poſture. Rogobah, with apparent ſurpriſe and anger, ordered them to withdraw; but as they either knew him not to be ſincere, or thought they had proceeded too far to retreat, they ſtabbed Narrain with their poniards whilſt he clung to his uncle's knees.

The office of Paiſhwa being now vacant, the chiefs of the nation then at Poonah were aſſembled, and Rogobah being the only ſurvivor of the family of Biſſonat Balajee, to whoſe memory the Marhattas in thoſe parts are enthuſiaſtically attached, he was named to fill it. Being naturally of a warlike temper, he reſolved to undertake ſome foreign expedition; for beſides gratifying his paſſion for the field, he probably hoped, by the ſplendour of his exploits, to draw off the attention of the public from inquiring into the late cataſtrophe.

A pretence for war was not difficult to be found. He renewed the claim of his nation to the *chout*, and marched his army towards Hydrabad, the capital of the Nizam. The vigour of his meaſures procured him an accommodation of his demand; and he was proceeding to enforce a ſimilar one upon the Carnatic, when he received intelligence which obliged him to return haſtily to Poonah.

Although the Marhatta chiefs had acknowledged Rogobah as Paiſhwa, yet they and the people in general were much diſſatisfied with his conduct. The murderers of Narrain Row had not only eſcaped puniſhment, but, as was reported, had been rewarded. The crime was unexampled, and its perpetrators were beheld with uncommon horror and deteſtation. The Paiſhwa had hitherto ſo fully poſſeſſed the love of the people, that, till then, guards were conſidered as unneceſſary about the perſon of a man whoſe character rendered him inviolable. Every one therefore had free acceſs to his palace, and he relied with confidence for his ſafety upon the affections of thoſe who approached him.

Theſe reflections operated powerfully upon the minds of the Marhattas; but perhaps no violent conſequences would have enſued, had it not been diſcovered, ſoon after the departure of Rogobah from Poonah, that the widow of Narrain Row, Ganga Baee, was pregnant. This determined their wavering reſolutions. Frequent conſultations were held among the principal men then in the capital; and it was finally reſolved to abjure the allegiance they had ſworn to Rogobah, and declare the child, yet unborn, to be the legal ſucceſſor of the late paiſhwa.

A council of regency was immediately appointed to govern the country until the child ſhould become of age; and it was agreed to reſerve their deliberations, in caſe it ſhould prove a female or die, till the event ſhould render them neceſſary. They who principally conducted theſe meaſures, and whoſe names will on that account be remembered, were Sackharam Babou and Balajee Pundit, called alſo Nanah Pher Nevees from his having been long the principal ſecretary of the Marhatta ſtate. Nine other Marhatta leaders approved of theſe meaſures, and ſwore to maintain them.

As the firſt ſtep towards the execution of their plan, the widow of Narrain Row was conveyed to Poorendher, a fort of great ſtrength, ſituated on a high mountain, about 25 miles from Poonah. As ſoon as Rogobah received intimation of this revolution, he marched back towards the capital. But diſcontent had already infected his troops; ſome of the chiefs retired to their eſtates, and others joined the ſtandard of the regents. He however riſked a battle with an army of the revolters commanded by Trimbec Row, in which the latter was ſlain; but though he obtained a victory, the ſtrength of the confederates daily increaſed, while his own troops were diminiſhed by continual deſertions. He therefore found it neceſſary to retire to Ugein, and to ſolicit the aſſiſtance of the Marhatta chiefs Scindia and Holkar; but meeting with a refuſal, he went to Surat, and applied for ſuccour to the Engliſh.

Rogobah's ſucceſs in this application was the cauſe of two wars with the Marhatta ſtate; which, after much waſte of blood and treaſure, we were obliged to conclude by relinquiſhing his claim, and acknowledging as legal paiſhwa the ſon of Narrain Row, who was born about ſeven months after the death of his father. See INDIA and HINDOSTAN.

The Marhatta dominions, as already obſerved, are governed by a number of ſeparate chiefs, all of whom acknowledge the Ram Rajah as their ſovereign; and all except Moodajee Boonſalah, own the paiſhwa as his vicegerent. The country immediately ſubject to the paiſhwa, including all the hereditary territories that were left by the Rajah Sahou to the Ram Rajah.

and thoſe that have been acquired and added to them ſince in his name, extend along the coaſt nearly from Goa to Cambay; on the ſouth it borders on the poſſeſſions of Tippoo Saib, eaſtward on thoſe of the Nizam and of the Marhatta rajah of Berar, and towards the north on thoſe of the Marhatta chiefs Scindia and Holkar.

Moodajee Boonſalah, rajah of Berar, poſſeſſed, beſides Berar, the greateſt part of Orixa. This prince being deſcended from the line of the Ram Rajah, eyes the power of the paiſhwa, by whom a branch of his family is kept in ignominious confinement, with ill will; has often refuſed to ſupport his meaſures; and, on ſome occaſions, has even ſeemed inclined to act againſt him.

Next to Moodajee, in point of importance, muſt be ranked Madajee Scindia, a bold and aſpiring chief, who poſſeſſes the greateſt part of the extenſive ſoubadary or government of Malva, together with part of the province of Candeiſh. The remainder is under the dominion of Holkar. Both he and Scindia pretend to be deſcended from the ancient kings of Malva. Scindia reſides chiefly at Ugein, near the city of Mundu, once the capital of theſe kings; and Holkar at Indoor, a town little more than 30 miles weſt of it. The dominions of theſe, and of ſome chiefs of leſs conſequence, extend as far as the river Jumna.

The meaſures purſued by the Marhattas for ſome years left little room to doubt that they aſpired at the ſovereignty of all Hindoſtan, or at leaſt at the expulſion of the Mohamedan princes: And in this laſt deſign they appear to have ſucceeded *, and to have gained a great acceſſion of territory, through the arms of Scindia, both by the capture of the cities of Agra and Delhi, with their territorial dependencies, and the conſequent captivity of the unfortunate monarch who ruled there as the laſt imperial repreſentative of the great Mogul race of Timur. "The whole of the dominion thus newly eſtabliſhed is of vaſt extent, ſtretching near 1200 miles along the frontiers of Tippoo and the Nizam in a north-eaſt direction, from Goa on the Malabar coaſt to Balaſore in Oriſſa adjoining to Bengal; and from thence north-weſterly 1000 miles more, touching the confines of the Britiſh and allied ſtates, on the borders of the Ganges and Jumna, to the territory of the Seiks at Paniput, rendered famous in 1761 for the laſt memorable defeat ſuſtained by the Marhattas in their ambitious conteſt for empire with the united declining power of the Mohamedans. From this place in a ſoutherly courſe, with great encroachment on the old eaſtern boundary of the Rajepoot country of Ajmere, it runs about 260 miles to the little Hindoo principality of Kotta, and thence ſouthweſterly 530 miles farther to the extreme point of the ſoubah of Gujerat at Duarka, including the whole of that fertile province; from whence, along the ſeacoaſts of Cambay and Malabar to Goa, the diſtance may be reckoned 800 miles. Thus the overgrown empire of the Marhattas may be ſaid to extend eaſt 19 degrees of longitude, near the parallel of 22 degrees north latitude, from the mouths of the Indus to thoſe of the Ganges; and about 13 degrees of latitude north, from the Kiſtnah to Paniput; comprehending at leaſt an area of 400,000 ſquare geographical miles, being conſiderably more than a third part of Hindoſtan, including the Decan, and equal perhaps in dimenſions to all the Britiſh and allied ſtates in India, with thoſe of Golconda and Myſore, taken together.

Such was the ſtate of affairs in India ſo far as the Marhattas were concerned a few years ago. By conſulting the hiſtory of India, the reader will obſerve, that the power and dominion of theſe enterpriſing chiefs have been ſince greatly abridged by the ſucceſsful progreſs of the Britiſh arms. See INDIA.

* *An Hiſtorical and Political View of the Decan.*

MARIA, or SANCTA MARIA, an iſland of the Indian ocean, lying about five miles eaſt from Madagaſcar. It is about 27 miles long and five broad; well watered, and ſurrounded by rocks. The air is extremely moiſt, for it rains almoſt every day. It is inhabited by 500 or 600 negroes, but ſeldom viſited by ſhips.

MARIA, *St*, a conſiderable town of South America, in the audience of Panama, built by the Spaniards after they had diſcovered the gold mines near it, and ſoon after taken by the Engliſh. It is ſeated at the bottom of the gulf of St Michael, at the mouth of a river of the ſame name; which is navigable, and the largeſt that falls into the gulf. The Spaniards come here every year in the dry ſeaſon, which continues three months, to gather the gold duſt out of the ſands of the neighbouring ſtreams; and carry away great quantities. W. Long. 148. 30. N. Lat. 7. 0.

MARIA, *St*, a handſome and conſiderable town of Spain, in Andaluſia, with a ſmall caſtle. It was taken by the Engliſh and Dutch in 1702, for the archduke of Auſtria. It is ſeated on the Guadaleta, at the mouth of which is a tower and a cloſe battery. W. Long. 5. 33. N. Lat. 36. 35.

MARIAN ISLANDS. See *LADRONE Iſlands*.

MARIANA, JOHN, a learned Spaniſh hiſtorian, born at Talavera in the dioceſe of Toledo. He entered among the Jeſuits in 1554, at 17 years of age; and became one of the moſt learned men of his time. He was a great divine, a good humaniſt, and profoundly verſed in eccleſiaſtical as well as profane hiſtory. He taught at Rome, in Sicily, at Paris, and in Spain; and died at Toledo in 1624. His principal works are, 1. An excellent hiſtory of Spain in 30 books; which he himſelf tranſlated from the Latin into Spaniſh, without ſervilely following his own Latin edition. 2. *Scholia*, or ſhort notes on the Bible. 3. A treatiſe on the changes the ſpecie has undergone in Spain; for which he was thrown into priſon by the duke of Lerma, the Spaniſh miniſter. 4. A famous treatiſe *De rege et regis inſtitutione*, which made much noiſe, and was condemned by the parliament of Paris to be burnt by the hands of the common hangman, for his aſſerting in that work, that it is lawful to murder tyrants. 5. A work on the faults of the government of the ſociety of Jeſuits, which has been tranſlated into Spaniſh, Latin, Italian, French, &c.

MARIANUS SCOTUS, an Iriſh monk, was related to the venerable Bede, and wrote a chronicle which is eſteemed. He died in the abbey of Fuld in 1086, aged 58.

MARIBONE, or ST MARY LE BONE, or rather *Borne*, from the neighbouring brook, a pariſh of Middleſex, on the north-weſt ſide of London. The manor appears to have belonged anciently to the biſhop of London.

Maridunum ‖ Marine.

London. The houſes in this pariſh are very numerous, compriſing ſeveral extenſive ſtreets and ſquares, which are every year increaſing. The Paddington road from Iſlington paſſes through this pariſh, which gives it communication with the eaſtern part of London without paſſing through the ſtreets. Here were three conduits erected about the year 1238, for ſupplying the city of London with water; but anno 1703, when it was plentifully ſerved by the New River, the citizens let them out at 700l. a-year for 43 years. There were two for receiving its water at the north-eaſt corner of the bridge on the river Tyburn, and over them ſtood the lord mayor's banqueting houſe, to which (the uſe of coaches being not then known) his lordſhip and the aldermen uſed to ride on horſeback, as their ladies did in waggons. This banqueting houſe, after being many years neglected, was taken down in 1737, and the ciſterns arched over. This village, if it may be called by that name, is joined by new buildings to London. The old church, which was a mean edifice, was pulled down, and a new one erected in 1741. Beſides which it has a great number of chapels of every ſect and perſuaſion, and an extenſive workhouſe for the poor.

MARIDUNUM, in *Ancient Geography*, a town of the Demetæ in Britain. Now *Caer Mardin*, or *Caermarthen*, the capital of Caermarthenſhire.

MARIGALANTE, an iſland of North America, and one of the leaſt of the Caribbees, lies in N. Lat. 16. 32. and W. Long. 61. 5. from London, at the diſtance of four leagues from Guadaloupe, to the ſouth. The ſoil, produce, and climate, are pretty much the ſame as the other Caribbees. Columbus diſcovered it in his ſecond American voyage in 1483, and called it by the name of his ſhip Maria Galanta, or Gallant Mary. It is about ſix leagues long, and between three and four broad. Viewed at a diſtance from on board a ſhip, it appears like a floating iſland, becauſe, as it is for the moſt part flat, the trees ſeem to ſwim; but a nearer proſpect ſhows it to be interſected by ſome riſing grounds, which give a fine variety to the landſcape. The French ſettled here in 1648; and it was taken by the Engliſh in 1691, but the French ſoon got poſſeſſion of it again. It was again taken by the Britiſh in 1750, but afterwards reſtored at the peace 1763.—This iſland was thought, on its firſt diſcovery, to want water; but a charming running ſtream has in time been diſcovered, no leſs convenient than refreſhing and wholeſome, on the banks of which are ſome wealthy planters, and excellent plantations of ſugar. A little village in a ſmall bay is the capital of the iſland, and here the commandant reſides. The whole iſland is very capable of improvement; the ſoil being almoſt equally good, and the land riſing nowhere too high. The coaſt affords many little bays, and ſafe anchorage and ſhelter to ſhips.

MARINE, a general name for the navy of a kingdom or ſtate; as alſo the whole economy of naval affairs; or whatever reſpects the building, rigging, arming, equipping, navigating, and fighting ſhips. It comprehends alſo the government of naval armaments, and the ſtate of all the perſons employed therein, whether civil or military.

The hiſtory of the marine affairs of any one ſtate is a very comprehenſive ſubject, much more that of all nations. Thoſe who would be informed of the maritime affairs of Great Britain, and the figure it has made at ſea in all ages, may find abundance of curious matter in Selden's *Mare Clauſum*: and from his time to ours, we may trace a ſeries of facts in Lediard's and Burchet's Naval Hiſtory; but above all in the Lives of the Admirals, by the accurate and judicious Dr Campbell.

Marin

MARINES, or *Marine Forces*, a body of ſoldiers raiſed for the ſea ſervice, and trained to fight either in a naval engagement or in an action aſhore.

The great ſervice of this uſeful corps was manifeſted frequently in the courſe of the war before laſt, particularly at the ſiege of Belleiſle, where they acquired a great character, although lately raiſed and hardly exerciſed in military diſcipline. At ſea they are incorporated with the ſhip's crew, of which they make a part: and many of them learn in a ſhort time to be excellent ſeamen, to which their officers are ordered by the admiralty to encourage them, although no ſea officer is to order them to go aloft againſt their inclination. In a ſea fight their ſmall arms are of very great advantage in ſcouring the decks of the enemy; and when they have been long enough at ſea to ſtand firm when the ſhip rocks, they muſt be infinitely preferable to ſeamen if the enemy attempts to board, by raiſing a battalion with their fixed bayonets to oppoſe him.

The ſole direction of the corps of marines is veſted in the lords commiſſioners of the admiralty; and in the admiralty is a diſtinct apartment for this purpoſe. The ſecretary to the admiralty is likewiſe ſecretary to the marines, for which he has a ſalary of 300l. a-year; and he has under him ſeveral clerks for the management of this department.

The marine forces of Great Britain in the time of peace are ſtationed in three diviſions; one of which is quartered at Chatham, one at Portſmouth, and another at Plymouth. By a late regulation, they are ordered to do duty at the ſeveral dock-yards of thoſe ports, to prevent embezzlement of the king's ſtores, for which a captain's guard mounts every day; which certainly requires great vigilance, as ſo many abuſes of this kind have been committed, that many of the inhabitants, who have been long uſed to an infamous traffic of this kind, expect theſe conveyances at certain periods as their due, and of courſe reſent this regulation in the higheſt degree as an infringement of their liberties as Britiſh ſubjects.

The marine corps are under the command of their own field officers, who diſcipline them, and regulate their different duties. His late majeſty in 1760 formed a new eſtabliſhment of marine officers, entitled, the *general*, *lieutenant general*, and *three colonels* of marines (one for each diviſion), to be taken from officers in the royal navy. The two firſt are always enjoyed by flag officers, the laſt by poſt captains only. This eſtabliſhment was formed to reward ſuch officers who diſtinguiſhed themſelves in the ſervice of their country.

Marine Diſcipline, is the training up ſoldiers for ſea ſervice, in ſuch exerciſes as the various poſitions of the firelock and body, and teaching them every manœuvre that can be performed on board ſhips of war at ſea. See Exercise.

Marine Chair, a machine invented by Mr Irwin for viewing the ſatellites of Jupiter at ſea, and of courſe determining the longitude by their eclipſes. An account of it is given in the *Journal Eſtranger* for March 1760. An account of its accuracy was publiſhed the year following by M. de l'Iſle aſtronomer in the Imperial academy of Peterſburg: but notwithſtanding the encomiums beſtowed upon it by this gentleman, it hath never come into general uſe; and therefore we may conclude, that it is much inferior to the inventions of Mr Harriſon for the ſame purpoſe. See Harrison and Longitude.

Marine Surveyor, is the name of a machine contrived by Mr H. de Saumarez for meaſuring the way of a ſhip in the ſea. This machine is in the form of the letter Y, and is made of iron, or any other metal. At each end of the lines which conſtitute the angle or upper part of that letter, are two pallets, not much unlike the figure of the log; one of which falls in the ſame proportion as the other riſes. The falling or pendant pallet meeting a reſiſtance from the water, as the ſhip moves, has by that means a circular motion under water, which is faſter or ſlower according as the veſſel moves. This motion is communicated to a dial within the ſhip, by means of a rope faſtened to the tail of the Y, and carried to the dial. The motion being thus communicated to the dial, which has a bell in it, it ſtrikes exactly the number of geometrical paces, miles, or leagues, which the ſhip has run. Thus the ſhip's diſtance is aſcertained; and the forces of tides and currents may alſo be diſcovered by this inſtrument: which, however, has been very little uſed.

Marine Acid, an old name given to muriatic acid, which ſee in Chemistry *Index*.

MARINER, the ſame with a ſailor or ſeaman. See theſe articles.

Method of preſerving the health of Mariners. See Seamen.

Mariner's Compaſs. See Compass.

St MARINO, a ſmall town and republic of Italy, ſituated in E. Long. 13. 44. N. Lat. 44. 21. This ſmall republic conſiſts only of a mountain, and a few hillocks, that lie ſcattered about the bottom of it. The number of the inhabitants is about 5000. The mountain yields good wine, but they have no other than rain or ſnow water. The founder of the republic was a Dalmatian, and a maſon, who upwards of 1300 years ago turned hermit, and retired to this mountain. Here his devotion and auſterity, and, in conſequence of that, his reputation for ſanctity, were ſuch, that the princes of the country made him a preſent of the mountain; on which many, out of veneration for the ſaint, ſoon after took up their abode. Thus was the foundation laid of the town and republic, which ſtill bears the name of the ſaint. The town ſtands on the top of the mountain, and there is only one way by which it can be come at. In the whole territory are only three caſtles, three convents, and five churches. The largeſt of the churches is dedicated to the ſaint, and contains his aſhes and his ſtatue. He is looked upon as the greateſt ſaint, next to the bleſſed Virgin; and to ſpeak diſreſpectfully of him is accounted blaſphemy, and puniſhed as ſuch. The republic is under the protection of the pope. All that are capable of bearing arms are exerciſed, and ready at a minute's call. In the ordinary courſe of government, the adminiſtration is in the hands of the council of 60, which, notwithſtanding its name, conſiſts only of 40; one-half of the members of which are of the noble families, and the other of the plebeian: on extraordinary occaſions, however, the arengo, in which every houſe has its repreſentative, is called together. The two principal officers are the capitaneos, who are choſen every half year; and next to them is the commiſſary, who judges in civil and criminal matters, and is joined in commiſſion with the capitaneos; both he and the phyſician muſt be foreigners, and both have their ſalaries out of the public ſtock. When any perſon, after due ſummons, neglects to aſſiſt at the council according to their ſtatute book, he is to be fined in about a penny Engliſh; and when an ambaſſador is to be ſent to any foreign ſtate, he is to be allowed about 1s. a-day.

Marino, *John Baptiſt*, a celebrated Italian poet, born at Naples in 1569. His father, who was an able civilian, obliged him to ſtudy the law; at which being diſguſted, he left his parents, and retired to the houſe of the Sieur Manzi, who was a friend to all perſons of wit. He at length became ſecretary to Matthew of Capua, great admiral of the kingdom of Naples, and contracted a friendſhip with Taſſo. A ſhort time after, he went to Rome, and entered into the ſervice of Cardinal Aldobrandini, nephew to Pope Clement VIII. who took him with him to Savoy. Marino was in great favour with the court of Turin; but afterwards created himſelf many enemies there, the moſt furious of whom was the poet Gaſpard Murtola, who, attempting to ſhoot him with a piſtol, wounded one of the duke of Savoy's favourites. Marino being obliged to leave Turin, went to Paris at the deſire of Queen Mary de Medicis, and publiſhed there his poem on Adonis. He afterwards went to Rome, where he was made prince of the academy of the humoriſti; from thence to Naples, where he died while he was preparing to return home. He had a very lively imagination, but little judgement; and, giving way to the points and conceits then in vogue, his authority, far from correcting the falſe taſte of the Italians, ſerved rather to keep it farther from reformation. His works which are numerous, have been often printed.

MARINUS, an engraver, who flouriſhed about the year 1630, and reſided principally at Antwerp. His plates, Mr Strutt obſerves, are executed in a very ſingular ſtyle, with the graver only: The ſtrokes are very fine and delicate, and croſſed over each other in a lozenge-like form, which he filled up with thin long dots. His prints, though generally very neat, want the ſtyle of the maſter in the determination of the folds of the draperies and the outline of the human figure; the extremities of which are heavy, and not marked with preciſion. Fine impreſſions from his beſt plates are, however, much ſought after by collectors; thoſe eſpecially after Rubens and Jordans are held in high eſtimation.

MARIONIS, in *Ancient Geography*, a town of Germany: now Hamburg, a famous trading city on the Elbe, in Lower Saxony, in the duchy of Holſtein. Another Marionis (Ptolemy), thought to be Wiſmar, a town of Lower Saxony, in the duchy of Mecklenburgh.

MARJORAM. See Origanum, Botany *Index*.

MARITAGIUM. In the feudal cuſtoms, *marita-*

gium (as contradistinguiſhed from *matrimonium*) ſignifies the power which the lord or guardian in chivalry had of diſpoſing of his infant ward in matrimony. For while the infant was in ward, the guardian had the power of tendering him or her a ſuitable match without diſparagement or inequality: which if the infants refuſed, they forfeited the value of the marriage, *valorem maritagii*, to their guardian; that is, ſo much as a jury would aſſeſs, or any one would *bona fide* give to the guardian for ſuch an alliance: and if the infants married themſelves without the guardian's conſent, they forfeited double the value, *duplicem valorem maritagii*.

MARITIME, ſomething relating to, or bounded by the ſea. Thus a maritime province or country is one bounded by the ſea; and a maritime kingdom is one that makes a conſiderable figure, or that is very powerful at ſea. Hence, by *maritime* powers among the European ſtates, are underſtood Great Britain and formerly Holland.

Maritime State, in Britiſh polity, one of the three general diviſions of the laity: (See LAITY). This ſtate is nearly connected with the military; though much more agreeable to the principles of our free conſtitution. The royal navy of England hath ever been its greateſt defence and ornament; it is its ancient and natural ſtrength; the floating bulwark of the iſland; an army from which, however ſtrong and powerful, no danger can ever be apprehended to liberty; and accordingly it has been aſſiduouſly cultivated from earlieſt ages. To ſo much perfection was our naval reputation arrived in the 12th century, that the code of maritime laws, which are called the *laws of Oleron*, and are received by all nations in Europe as the ground and ſubſtruction of all their marine conſtitutions, was confeſſedly compiled by our king Richard I. at the iſle of Oleron on the coaſt of France, then part of the poſſeſſions of the crown of England. And yet ſo vaſtly inferior were our anceſtors in this point to the preſent age, that even in the maritime reign of Queen Elizabeth, Sir Edward Coke thinks it matter of boaſt, that the royal navy of England then conſiſted of *three and thirty ſhips*. The preſent condition of our marine is in great meaſure owing to the ſalutary proviſions of the ſtatutes called the *navigation acts*; whereby the conſtant increaſe of Engliſh ſhipping and ſeamen was not only encouraged, but rendered unavoidably neceſſary. By the ſtatute 5 Richard II. c. 3. in order to augment the navy of England, then greatly diminiſhed, it was ordained, that none of the king's liege people ſhould ſhip any merchandiſe out of or into the realm, but only in ſhips of the king's ligeance, on pain of forfeiture. In the next year, by ſtatute 6 Rich. II. c. 8. this wiſe proviſion was enervated, by only obliging the merchants to give Engliſh ſhips (if able and ſufficient) the preference. But the moſt beneficial ſtatute for the trade and commerce of theſe kingdoms is that navigation act, the rudiments of which were firſt framed in 1650, with a narrow partial view; being intended to mortify our own ſugar iſlands, which were diſaffected to the parliament, and ſtill held out for Charles II. by ſtopping the gainful trade which they then carried on with the Dutch, and at the ſame time to clip the wings of thoſe our opulent and aſpiring neighbours. This prohibited all ſhips of foreign nations from trading with any Engliſh plantations, without licenſe from the council of ſtate. In 1651, the prohibition was extended alſo to the mother country: and no goods were ſuffered to be imported into England, or any of its dependencies, in any other than Engliſh bottoms; or in the ſhips of that European nation of which the merchandiſe imported was the genuine growth or manufacture. At the Reſtoration, the former proviſions were continued, by ſtat. 12 Car. II. c. 18. with this very material improvement, that the maſter and three-fourths of the mariners ſhall alſo be Engliſh ſubjects.

Many laws have been made for the ſupply of the royal navy with ſeamen; for their regulation when on board; and to confer privileges and rewards on them during and after their ſervice.

1. For their ſupply. The principal, but the moſt odious, though often neceſſary method for this purpoſe, is by impreſſing; ſee IMPRESSING. But there are other ways that tend to the increaſe of ſeamen, and manning the royal navy. Pariſhes may bind out poor boys apprentices to the maſters of merchantmen, who ſhall be protected from impreſſing for the firſt three years; and if they are impreſſed afterwards, the maſters ſhall be allowed their wages: great advantages in point of wages are given to volunteer ſeamen, in order to induce them to enter into his majeſty's ſervice: and every foreign ſeaman, who, during a war ſhall ſerve two years in any man of war, merchantman, or privateer, is naturalized *ipſo facto*. About the middle of King William's reign, a ſcheme was ſet on foot for a regiſter of ſeamen to the number of 30,000 for a conſtant and regular ſupply of the king's fleet; with great privileges to the regiſtered men; and, on the other hand, heavy penalties in caſe of their non-appearance when called for; but this regiſtry, being judged to be rather a badge of ſlavery, was aboliſhed by ſtat. 9 Ann. c. 21.

2. The method of ordering ſeamen in the royal fleet, and keeping up a regular diſcipline there, is directed by certain expreſs rules, articles, and orders, firſt enacted by the authority of parliament ſoon after the Reſtoration; but ſince new modelled and altered, after the peace of Aix-la-Chapelle, to remedy ſome defects which were of fatal conſequences in conducting the preceding war. In theſe articles of the navy almoſt every poſſible offence is ſet down, and the puniſhment thereof annexed: in which reſpect the ſeamen have much the advantage over their brethren in the land ſervice; whoſe articles of war are not enacted by parliament, but framed from time to time at the pleaſure of the crown. Yet from whence this diſtinction aroſe, and why the executive power, which is limited ſo properly with regard to the navy, ſhould be ſo extenſive with regard to the army, it is hard to aſſign a reaſon: unleſs it proceeded from the perpetual eſtabliſhment of the navy, which rendered a permanent law for their regulation expedient, and the temporary duration of the army, which ſubſiſted only from year to year, and might therefore with leſs danger be ſubjected to diſcretionary government. But, whatever was apprehended at the firſt formation of the mutiny act, the regular renewal of our ſtanding force at the entrance of every year has made this diſtinction idle.

For, if from experience paſt, we may judge of future events, the army is now laſtingly ingrafted into the Britiſh conſtitution; with this ſingularly fortunate circumſtance, that any branch of the legiſlature may annually put an end to its legal exiſtence, by refuſing to concur in its continuance.

3. The privileges conferred on ſailors, are pretty much the ſame with thoſe conferred on ſoldiers, with regard to relief, when maimed, or wounded, or ſuperannuated, either by county-rates, or the royal hoſpital at Greenwich; with regard alſo to the exerciſe of trades, and the power of making nuncupative teſtaments; and farther, no ſeaman aboard his majeſty's ſhips can be arreſted for any debt, unleſs the ſame be ſworn to amount at leaſt to twenty pounds; though, by the annual mutiny acts, a ſoldier may be arreſted for a debt which extends to half that value, but not to a leſs amount.

MARIUS, the famous Roman general, and ſeven times conſul, who ſullied his great military reputation by ſavage barbarities. He was born at Arpinum, of obſcure and illiterate parents. He forſook the meaner occupations of the country for the camp; and ſignalized himſelf under Scipio, at the ſiege of Numantia. The Roman general ſaw the courage and intrepidity of young Marius, and foretold the era of his future greatneſs. By his ſeditions and intrigues at Rome, while he exerciſed the inferior offices of the ſtate, he rendered himſelf known; and his marriage with Julia, who was of the family of the Cæſars, contributed in ſome manner to raiſe him to conſequence. He paſſed into Africa as lieutenant to the conſul Metellus againſt Jugurtha; and after he had there ingratiated himſelf with the ſoldiers, and raiſed enemies to his friend and benefactor, he returned to Rome and canvaſſed for the conſulſhip. The extravagant promiſes he made to the people, and his malevolent inſinuations about the conduct of Metellus, proved ſuccefsful. He was elected and appointed to finiſh the war againſt Jugurtha. He ſhowed himſelf capable in every degree to ſucceed to Metellus. Jugurtha was defeated, and afterwards betrayed into the hands of the Romans by the perfidy of Bocchus. No ſooner was Jugurtha conquered, than new honours and freſh trophies awaited Marius. The provinces of Rome were ſuddenly invaded by an army of 300,000 barbarians, and Marius was the only man whoſe activity and boldneſs could reſiſt ſo powerful an enemy. He was elected conſul, and ſent againſt the Teutones. The war was prolonged, and Marius was a third and fourth time inveſted with the conſulſhip. At laſt two engagements were fought, and not leſs than 200,000 of the barbarian forces of the Ambrones and Teutones were ſlain in the field of battle, and 90,000 made priſoners. The following year, A. U. C. 651, was alſo marked by a total overthrow of the Cimbri, another horde of barbarians; in which 140,000 were ſlaughtered by the Romans, and 60,000 taken priſoners. After ſuch honourable victories, Marius with his colleague Catullus entered Rome in triumph; and for his eminent ſervices he received the appellation of the *third founder of Rome*. He was elected conſul a ſixth time; and as his intrepidity had delivered his country from its foreign enemies, he ſought employment at home, and his reſtleſs ambition began to raiſe ſeditions, and to oppoſe the power of Sylla. This was the foundation of a civil war. Sylla refuſed to deliver up the command of his forces, with which he was empowered to proſecute the Mithridatic war; and he reſolved to oppoſe in perſon the authors of a demand which he conſidered as arbitrary and improper. He advanced to Rome, and Marius was obliged to ſave his life by flight. The unfavourable winds prevented him from ſeeking a ſafer retreat in Africa, and he was left on the coaſt of Campania, where the emiſſaries of his enemy ſoon diſcovered him in a marſh, where he had plunged himſelf in the mud, and left only his mouth above the ſurface for reſpiration. He was violently dragged to the neighbouring town of Minturnæ; and the magiſtrates, all devoted to the intereſt of Sylla, paſſed ſentence of immediate death on their magnanimous priſoner. A Gaul was commanded to cut off his head in the dungeon; but the ſtern countenance of Marius diſarmed the courage of the executioner: and when he heard the exclamation of *Tune, homo, audes occidere Caium Marium?* the dagger dropped from his hand. Such an uncommon adventure moved the compaſſion of the inhabitants of Minturnæ. They releaſed Marius from priſon; and favoured his eſcape to Africa, where he joined his ſon Marius, who had been arming the princes of that country in his cauſe. Marius landed near the walls of Carthage, and he received no ſmall conſolation at the ſight of the venerable ruins of a once powerful city, which like himſelf had been expoſed to calamity, and felt the cruel viciſſitude of fortune. This place of his retreat was ſoon known; and the governor of Africa, to conciliate the favour of Sylla, compelled Marius to fly to a neighbouring iſland. He ſoon after learned that Cinna had embraced his cauſe at Rome, when the Roman ſenate had ſtripped him of his conſular dignity, and beſtowed it upon one of his enemies. This intelligence animated Marius; he ſet ſail to aſſiſt his friend only at the head of 1000 men. His army, however, was ſoon increaſed, and he entered Rome like a conqueror. His enemies were inhumanly ſacrificed to his fury; Rome was filled with blood; and he, who once had been called the father of his country, marched through the ſtreets of the city, attended by a number of aſſaſſins, who immediately ſlaughtered all thoſe whoſe ſalutations were not anſwered by their leader. Such were the ſignals for bloodſhed. When Marius and Cinna had ſufficiently gratified their reſentment, they made themſelves conſuls; but Marius, already worn out with old age and infirmities, died ſixteen days after he had been honoured with the conſular dignity for the ſeventh time, A. U. C. 666. Such was the end of Marius, who rendered himſelf conſpicuous by his victories and by his cruelty. As he was brought up in poverty and among peaſants, it will not appear wonderful that he always betrayed ruſticity in his behaviour, and deſpiſed in others thoſe poliſhed manners and that ſtudied addreſs, which education had denied him. He hated the converſation of the learned only becauſe he was illiterate; and if he appeared an example of ſobriety and temperance, he owed theſe advantages to the years of obſcurity which he paſſed at Arpinum. His countenance was ſtern, his voice firm and imperious, and his diſpoſition untractable. He was in the [illegible] year of his age when he died; and Rome ſeemed to rejoice at the fire of a popular ambition had proved ſo fatal to many of his citizens. His only qualifications were thoſe of a great general; and with theſe he rendered himſelf the moſt illuſtrious and powerful of the Romans, becauſe he was the only one whoſe ferocity ſeemed capable to oppoſe the barbarians of the north.

Marius, C. the ſon of the great Marius, was as cruel as his father, and ſhared his good and his adverſe fortune. He made himſelf conſul in the 25th year of his age, and murdered all the ſenators who oppoſed his ambitious views. He was defeated by Sylla, and fled to Præneſte, where he killed himſelf.

Marius, M. Aurelius, a native of Gaul; who, from the mean employment of a blackſmith, became one of the generals of Gallienus, and at laſt cauſed himſelf to be ſaluted emperor. Three days after this elevation, a man who had ſhared his poverty without partaking of his more proſperous fortune, publicly aſſaſſinated him, and he was killed by a ſword which he himſelf had made in the time of his obſcurity. Marius has been often celebrated for his great ſtrength; and it is confidently reported, that he could ſtop, with one of his fingers only, the wheel of a chariot in its moſt rapid courſe.

Marius, Maximus, a Latin writer, who publiſhed an account of the Roman emperors from Trajan to Alexander, now loſt. His compoſitions were entertaining, and executed with great exactneſs and fidelity. Some have accuſed him of inaccuracy, and complain that his writings abounded with many fabulous and impertinent ſtories.

MARIVAUX, Peter Carlet de, a French writer in the dramatic way and in romance, was born of a good family at Paris in 1688. A fine underſtanding, well improved by education, diſtinguiſhed him early. His firſt object was the theatre, where he met with the higheſt ſucceſs in comic productions; and theſe, with the merit of his other works, procured him a place in the French academy. The great characteriſtic of both his comedies and romance was, to convey an uſeful moral under the veil of wit and ſentiment: "My only object (ſays he) is to make men more juſt and more humane;" and he was as amiable in his life and converſation as he was in his writings. He died at Paris in 1763, aged 75. His works conſiſt of, 1. *Pieces de Theatre*, 4 vols. 12mo. 2. *Homere traveſti*, 12mo; which is not ſuppoſed to have done much honour to his taſte. 3. *Le Spectateur François*, 2. vols. 12mo. 4. *Le Philoſophe Indegent*, 12mo. 5. *Vie de Marianne*, 2 vols. 12mo; one of the beſt romances in the French language. 6. *Le Payſan Parvenu*, 12mo. 7. *Pharſamon*; inferior to the former.

MARK, St, was by birth a Jew, and deſcended of the tribe of Levi. He was converted by ſome of the apoſtles, probably by St Peter; to whom he was a conſtant companion in all his travels, ſupplying the place of an amanuenſis and interpreter. He was by St Peter ſent into Egypt, fixing his chief reſidence at Alexandria, and the places thereabout: where he was ſo ſucceſsful in his miniſtry, that he converted multitudes both of men and women. He afterwards removed weſtwards, towards the parts of Libya, going through the countries of Marmorica, Pentapolis, and others thereabouts; where, notwithſtanding the barbarity and idolatry of the inhabitants, he planted the goſpel. Upon his return to Alexandria, he ordered the affairs of that church, and there ſuffered martyrdom in the following manner. About Eaſter, at the time the ſolemnities of Serapis were celebrated, the idolatrous people, being excited to vindicate the honour of their deity, broke in upon St Mark, while he was performing divine ſervice, and, binding him with cords, dragged him through the ſtreets, and thruſt him into priſon, where in the night he had the comfort of a divine viſion. Next day the enraged multitude uſed him in the ſame manner, till, his ſpirits failing, he expired under their hands. Some add, that they burnt his body, and that the Chriſtians decently interred his bones and aſhes near the place where he uſed to preach. This happened in the year of Chriſt 68. Some writers aſſert, that the remains of St Mark were afterwards, with great pomp, tranſlated from Alexandria to Venice. However, he is the tutelar ſaint and patron of that republic, and has a very rich and ſtately church dedicated to his memory. This apoſtle is author of one of the four goſpels inſcribed with his name. See the following article.

St Mark's Goſpel, a canonical book of the New Teſtament, being one of the four goſpels.

St Mark wrote his goſpel at Rome, where he accompanied St Peter in the year of Chriſt 44. Tertullian and others pretend, that St Mark was no more than an amanuenſis to St Peter, who dictated this goſpel to him; others affirm, that he wrote it after St Peter's death. Nor are the learned leſs divided as to the language it was written in; ſome affirming that it was compoſed in Greek, others in Latin. Several of the ancient heretics received only the goſpel of St Mark: others, among the Catholics, rejected the 12 laſt verſes of this goſpel. The goſpel of St Mark is properly an abridgement of that of St Matthew.

St Mark the Evangeliſt's Day, a feſtival of the Chriſtian church, obſerved April 25.

Canons of St Mark, a congregation of regular canons founded at Mantua, by Albert Spinola, a prieſt, towards the end of the 12th century. Spinola made a rule for them, which was approved, corrected, and confirmed by ſeveral ſucceeding popes. About the year 1450 they were reformed, and followed only the rule of St Auguſtine. This congregation having flouriſhed for the ſpace of 400 years, declined by little and little, and is now become extinct.

Knights of St Mark, an order of knighthood in the republic of Venice, under the protection of St Mark the evangeliſt. The arms of the order are, gules, a lion winged or; with this device, Pax tibi Marce Evangelista. This order is never conferred but on thoſe who have done ſignal ſervice to the commonwealth.

Mark, or *Marc*, in commerce, denotes a weight uſed in ſeveral ſtates of Europe, and for ſeveral commodities, eſpecially gold and ſilver. In France, the mark is divided into eight ounces, 64 drachms, 192 deniers or penny-weights, 160 eſterlins, 300 mails, 640 ſelins, or 4608 grains. In Holland, the mark weight is alſo called *Troy-weight*, and is equal to that of France. When gold and ſilver are ſold by the mark, it is divided into 24 carats.

Mark is ſtill uſed among us for a money of account, and in ſome other countries for a coin. See *Money-Table*.

The Engliſh mark is two thirds of a pound ſterling, or 13 s. 4 d. and the Scotch mark is of equal value in Scots money of account, viz. 13⅓ d.

MARKET, a public place in a city or town, in which live cattle, proviſions, or other goods, are ſet to ſale; and alſo a privilege, either by grant or preſcription, by which a town is enabled to keep a market.

Court of the Clerk of the Market, is incident to every fair and market in the kingdom, to puniſh miſdemeſnors therein; as a court of *pie poudre* is to determine all diſputes relating to private or civil property. The object of this juriſdiction (ſee ſtat. 17 Car. II. cap. 10. 22 Car. II. cap. 8. 23 Car. II. cap. 12). is principally the cognizance of weights and meaſures to try whether they be according to the true ſtandard thereof or not; which ſtandard was anciently committed to the cuſtody of the biſhop, who appointed ſome clerk under him to inſpect the abuſe of them more narrowly; and hence this officer, though now uſually a layman, is called the clerk of the market.—If they be not according to the ſtandard, then, beſide the puniſhment of the party by fine, the weights and meaſures themſelves ought to be burnt. This is the loweſt court of criminal juriſdiction in the kingdom.

MARKLAND, Jeremiah, one of the moſt learned ſcholars and penetrating critics of the age, was born in 1693, and received his education in Chriſt's hoſpital. He became firſt publicly known by his *Epiſtola Critica*, addreſſed to Biſhop Hare. In this he gave many proofs of extenſive erudition and critical ſagacity. He afterwards publiſhed an edition of Statius, and ſome plays of Euripides; and aſſiſted Dr Taylor in his editions of Lyſias and Demoſthenes, by the notes which he communicated to him. He has alſo very happily elucidated ſome paſſages in the New Teſtament, which may be found in Mr Bowyer's edition of it; and was author of a very valuable volume of remarks on the epiſtles of Cicero to Brutus, and of an excellent little treatiſe under the title of *Queſtio Grammatica*. He died in 1775, at Milton, near Dorking in Surry; and was a man not more valued for his univerſal reading than beloved for the excellency of his heart and primitive ſimplicity of his manners.

MARLBOROUGH, a town of Wiltſhire in England, ſituated near the ſource of the Kennet, at the foot of a chalky hill, 75 miles from London. It has its name from the chalky ſoil, which was formerly called *marl*. It was a Roman ſtation. In the year 1627, a parliament was held in the caſtle here, which made thoſe laws called *Marlborough ſtatutes*. There are ſtill ſome ſmall remains of its walls and ditch. The town, which is an ancient borough by preſcription, ſends two members to parliament. It is governed by a mayor, 2 juſtices, 12 aldermen, 24 burgeſſes, a town-clerk, 2 bailiffs, 12 ſerjeants at mace, &c. It conſiſts chiefly of one broad ſtreet, with piazzas all along one ſide of it, two pariſh churches, and ſeveral commodious inns, it being the grand thoroughfare from London to Bath and Briſtol. To the ſouth are ſome relicts of a priory, particularly the Gate-houſe; and the ſite of a Roman caſtrum, the foundations of which have been diſcovered there, with Roman coins. The ditch is ſtill in ſome parts 20 feet wide, and towards the river, without the garden walls, one angle of the caſtrum is very viſible with the rampart and ditch entire. The mount at the weſt end of the town, which was the keep or main guard of the caſtle, is coverted into a pretty ſpiral walk; at the top of which is an octagon ſummer houſe. This town has often ſuffered by fire, particularly in 1690, whereupon the parliament paſſed an act to prevent its houſes from being thatched.

Marlborough, *Duke of*. See Churchill.

Marlborough-Fort, an Engliſh factory on the weſt coaſt of the iſland of Sumatra in Aſia; ſeated three miles weſt of the town of Bencoolen. E. Long. 101. 12. S. Lat. 4. 21.

MARLE, a mixture of calcareous with ſiliceous and argillaceous earth, very much uſed in agriculture as a manure. See Agriculture and Mineralogy *Index*.

MARLINE, in ſea affairs, are tarred white ſkains, or long wreaths or lines of untwiſted hemp, dipped in pitch or tar, with which cables or other ropes are wrapped round, to prevent their fretting or rubbing in the blocks or pulleys through which they paſs. The ſame ſerves in artillery upon ropes uſed for rigging gins, uſually put up in ſmall parcels called *ſkains*.

MARLOE, Christopher, an Engliſh dramatic author, was a ſtudent in the univerſity of Cambridge; but afterwards turning player, he trode the ſame ſtage with the inimitable Shakeſpeare. He was accounted an excellent poet even by Ben Johnſon himſelf. He wrote ſix tragedies, one of which called Luſt's Dominion, or the Laſcivious Queen, has been altered by Mrs Behn, and acted under the title of Abdelazar, or the Moor's Revenge. Some time before his death, he had made a conſiderable progreſs in an excellent poem entitled Hero and Leander: which was afterwards finiſhed by George Chapman, who is ſaid to have fallen ſhort of the ſpirit and invention diſcovered by Marloe. Mr Anthony Wood repreſents him as a freethinker in the worſt ſenſe of the word; and gives the following account of his death. Falling deeply in love with a low girl, and having for his rival a fellow in livery, Marloe, imagining that his miſtreſs granted him favours, was fired with jealouſy, and ruſhed upon him in order to ſtab him with his dagger: but the footman avoided the ſtroke, and, ſeizing his wriſt, ſtabbed him with his own weapon; of which wound he died, in the year 1593.

MARLOW, a town of Buckinghamſhire, in England, 31 miles from London, lies under the Chiltern hills, in a marly ſoil. It is a pretty large borough, though not incorporated, with a bridge over the Thames, not far from its conflux with Wycomb, and has a handſome church and town-hall. It firſt ſent members to parliament in the reign of Edward II. Bone lace is its chief manufacture. The Thames brings goods hither from the neighbouring towns, eſpecially great quantities of meal and malt from High Wycomb, and beech from ſeveral parts of the county, which abounds with this wood more than any in England. In the neighbourhood are frequent horſe-races; and here are ſeveral corn and paper mills, particularly on the river Loddon, between this town and High Wycomb. There are, beſides, the Temple mills, for making thimbles, and another for preſſing oil from rape and flax ſeed.

At Great Marlow there is an inſtitution ſupported by government for the education of young men deſtined for the army. The pupils are entirely under military diſcipline, and are inſtructed by able profeſſors in the various branches of mathematics, &c. connected with military tactics.

MARLY, a palace belonging to the king of France, between Verſailles and St Germain; ſeated in a valley, near a village and foreſt of the ſame name. It is noted for its fine gardens and water-works, there being a curious machine on the river Seine, which not only ſupplies them with water, but alſo thoſe of Verſailles. It is 10 miles north-weſt of Paris. E. Long. 2. 11. N. Lat. 48. 52.

Marly, Machine at. When Lewis the Great had fixed upon a favourite ſituation in the foreſt of Marly, where he intended to erect a ſplendid caſtle, he found that it wanted nothing either in point of beauty or convenience but a fountain of water; and he immediately determined to ſupply by the aſſiſtance of art what nature had denied it. An ingenious and ſelf-taught carpenter from Liege, named Rannequin, undertook to conduct from the Seine a copious ſupply of water, and for this purpoſe contrived and erected the celebrated and complicated machine which we are now to deſcribe.

The machinery is driven by 14 underſhot water wheels of 36 feet diameter, reckoning from the ends of the floatboards, diſpoſed in three rows. In the firſt row there are ſeven wheels, in the ſecond ſix, and in the third only one. By theſe wheels the water is raiſed through pumps into the firſt reſervoir about 160 feet about the level of the river, then to a ſecond reſervoir 346 feet high, and from this to the ſummit of a tower about 533 feet above the Seine.

The two extremities of the axle of each wheel extend beyond the gudgeons on which they reſt, and are bent into a crank ſo as to form a lever two feet long. The crank which is towards the mountain drives the water of the river into the firſt reſervoir, and the other crank gives motion to the balances.

An engine of eight pumps is wrought by one of the cranks of each of the ſix wheels in the firſt row. Theſe engines conſiſt of a balance, at each end of which hangs a ſquare piece of wood that ſupports and directs four piſtons. This balance is moved by a beam in the form of a T, the horizontal part of which is connected at one end with the balance by the intervention of a vertical regulator or beam, and at the other with the crank of the wheel by means of a horizontal iron rod.

One of the cranks of each of the *ſix wheels* of the firſt row, (excepting that which is next the mountain), and two of the cranks of the 14th wheel, or that in the laſt row, give motion to the pumps in the river and carry the water into the firſt reſervoir. This motion is communicated from the cranks by means of an iron rod which is fixed to the lower end of a vertical balance. A horizontal regulator or beam is fixed to each end of this balance, and to theſe regulators are faſtened chains which follow the declivity of the mountain till they reach the ſuperior reſervoirs. When the wheel is revolving, therefore, one of theſe chains will be dragged towards the river, and the other towards the mountain. In order to produce this alternate motion, the chains are ſupported and kept at equal diſtances by a number of vertical balances, placed along the mountain at every three toiſes, and moving upon a centre ſupported by a frame lying between the two chains and equidiſtant from them. When theſe chains reach the firſt reſervoir they are fixed to vertical regulators, which carry frames, to which are adapted the piſtons of the ſucking pumps. Theſe regulators therefore will be drawn one after another by their correſponding chains; and when one regulator is drawn by its chain, the piſton of the pumps which it carries will be raiſed, and the water will follow them: At the ſame time the piſtons of the other regulator are deſcending to form a vacuum; and theſe in their turn aſcend with their load of water when the others are in the act of deſcending. In the pumps formerly mentioned which work in the river, an effect is produced upon the piſtons both when they aſcend and deſcend, becauſe they are moved by ſtiff iron rods; but in the preſent caſe the piſtons deſcend merely by their own weight, as the motion is tranſmitted only by a chain. By theſe pumps the water is conveyed to the upper reſervoir by two conduit pipes of eight inches and three others of ſix inches diameter.

The *ſixth wheel* of the firſt row, which is the firſt towards the dam, moves a long chain which works the pumps of one of the wells of the upper reſervoir. The ſeventh wheel gives motion to a chain which goes to the firſt ciſtern.

By means ſimilar to theſe already deſcribed, the ſix wheels of the ſecond row move by each of their cranks a chain that goes to the ſecond reſervoir, and eight of theſe chains work 16 pumps behind it, to bring back into the reſervoir the water which is loſt out of the ſix pipes that go to the tower. Theſe chains go over one of the firſt ciſterns, and five of them at the ſame time give motion to the piſtons of thirty pumps, whilſt the other chains go on ſtraight to the great reſervoir. Theſe 30 pumps convey their water through two pipes of 8 inches diameter into the upper reſervoir. The five chains, after working theſe 30 pumps, give motion to the piſtons of 82 pumps in the ſecond reſervoir which raiſe the water from it to the tower.

The baſis of the tower which receives the water raiſed from the river is 610 fathoms diſtant from it; and the water runs from this baſon along an aqueduct of 36 arches by its own weight. From this aqueduct the water is diſtributed into great reſervoirs, from which it is conveyed to the gardens and ſhrubberies around the caſtle.

The quantity of water raiſed by this machine amounts at a mean rate to 30,000 or 40,000 gallons per hour; though in favourable circumſtances it raiſes more than 60,000 gallons per hour. But while the Seine either overflows its banks, or is frozen, or when the water is very low, the machine is ſcarcely capable of performing any work.

The yearly expence of the machine at Marly including the ſalaries of the ſuperintendants and the expences of repairs, amounts to about 3300l. ſterling, or 9l. per day, which makes the expence of 90 gallons of water one farthing. But if we take into the account the intereſt of 333,000 l. the original expence of the machine, 90 gallons will coſt three halfpence, or 15 gallons one farthing.

Notwithſtanding the magnificence of this great machine, and the ingenuity which is diſplayed in its conſtruction, every perſon who examines it with care, will perceive innumerable defects, whether he examines it as a whole, or attends to the parts of which it is compoſed. In ſeveral poſitions the moving forces act with great obliquity, and therefore occaſion an immenſe waſte of power; and in order to give an alternate motion to a number of chains of balances extending to a diſtance of 3804 feet, more than nine-tenths of the impelling power are deſtroyed.

By a few changes upon the conſtruction of the machine, the water might have been raiſed from the river to the tower without any intermediate reſervoirs. This appears from two experiments made upon the machine in 1738 and 1775. In 1738 M. Camus attempted to raiſe the water to the tower at once. He was able, however, only to bring it to the bottom of the tower which was conſiderably higher than the ſecond reſervoir. By this experiment the machine was ſo much ſtrained that ſeveral parts required chains to ſecure it. In 1775 the water was elevated to the ſecond reſervoir at one jet at different times, but from the age and infirmity of the pipes ſeveral of them burſt during the experiment. Hence it is obvious that if the pipes had been made ſtronger, the firſt reſervoir and the machinery connected with it might have been diſpenſed with; and it is very probable that if the machine had been conſtructed with more judgement, the water might have been conducted at once from the river to the tower.

MARMALADE, a confection of plums, apricots, quinces, &c. boiled up to a conſiſtence with ſugar. In Scotland, it is made of Seville oranges and ſugar only.

MARMANDE, a town of France, in the department of Lot and Garonne. It carries on a great trade in corn and wine, and is ſeated on the river Garonne, in E. Long. 0 15. N. Lat. 44. 20.

MARMOR. See MARBLE.

MARMORA, the name of four iſlands of Aſia, in the ſea of the ſame name. The largeſt is about 30 miles in circumference; and the ſoil of them all produces corn, wine, and fruits. The ſea of Marmora is a large gulf, which communicates both with the Archipelago and the Black ſea by that of Conſtantinople, being 120 miles in length and 50 in breadth; and all ſhips muſt paſs through it that ſail to Conſtantinople from the Mediterranean. It was anciently the *Propontis*.

MARMORICA, a country of Africa anciently inhabited by the Libyans. It was bounded on the eaſt by Egypt, on the weſt by Cyrenaica, on the ſouth by Sahara, or the deſert of Libya Interior, and on the north by the Mediterranean; and was reckoned a part of Egypt. There is no diſtinct hiſtory of the country.

MAROBUDUN, in *Ancient Geography*, the royal reſidence of Marobuduus, king of the Marcomanni; and hence the appellation. Now thought to be *Prague*, the capital of Bohemia.

MAROLLES, MICHEL DE, born in 1600, was the ſon of Claude de Marolles, whom French memoirs make a military hero. Michel, however, was of a different compoſition. He entered early into the eccleſiaſtical ſtate, and by the intereſt of his father obtained two abbeys. He was formed with an extreme ardour for ſtudy, which never abated all his life long: for, from 1619 when he publiſhed a tranſlation of Lucan, to 1681 the year of his death, he was conſtantly employed in writing and printing. He attached himſelf unfortunately to the tranſlating of ancient Latin writers: but, being devoid of all claſſical taſte and ſpirit, they ſunk miſerably under his hands, the poets eſpecially. He was certainly, however, a man of great learning, and diſcovered all his life a love for the arts. He was one of the firſt who paid any attention to prints; and collected about 100,000, which make at this day one of the ornaments of the French king's cabinet. He compoſed memoirs of his own life, which were publiſhed by the abbé Goujet, 1755, in 3 vols. They contain, like ſuch ſort of things, ſome intereſting facts, but an infinity of minute and inſipid nothings.

MARONITES, in eccleſiaſtical hiſtory, a ſect of eaſtern Chriſtians, who follow the Syrian rite, and are ſubject to the pope; their principal habitation being on Mount Libanus.

Moſheim informs us, that the doctrine of the Monothelites, condemned and exploded by the council of Conſtantinople, found a place of refuge among the Mardaites, a people who inhabited the mounts Libanus and Antilibanus, and who, about the concluſion of the ſeventh century, were called *Maronites*, after *Maro* their firſt biſhop; a name which they ſtill retain. None (he ſays) of the ancient writers give any certain account of the firſt perſon who inſtructed theſe mountaineers in the doctrine of the Monothelites: it is probable, however, from ſeveral circumſtances, that it was John Maro, whoſe name they had adopted; and that this eccleſiaſtic received the name of Maro from his having lived in the character of a monk in the famous convent of St Maro, upon the borders of the Orontes, before his ſettlement among the Mardaites of Mount Libanus. One thing is certain, from the teſtimony of Tyrius and other unexceptionable witneſſes, as alſo from the moſt authentic records, viz. that the Maronites retained the opinions of the Monothelites until the 12th century, when, abandoning and renouncing the doctrine of one will in Chriſt, they were readmitted in the year 1182 to the communion of the Roman church. The moſt learned of the modern Maronites have left no method unemployed to defend their church againſt this accuſation; they have laboured to prove, by a variety of teſtimonies, that their anceſtors always perſevered in the Catholic faith, in their attachment to the Roman pontiff, without ever adopting the doctrine of the Monophyſites, or Monothelites. But all their efforts are inſufficient to prove the truth of their aſſertions to ſuch as have any acquaintance with the hiſtory of the church and the records of ancient times; for to all ſuch the teſtimonies they allege will appear abſolutely fictitious and deſtitute of authority.

Fauſtus Nairon, a Maronite ſettled at Rome, has publiſhed an apology for Maro and the reſt of his nation. His tenet is, that they really took their name from the Maro who lived about the year 400, and of whom mention is made in Chryſoſtom. [illegible] and the Menologium of the Greeks. He adds, that the diſciples of this Maro ſpread themſelves through all Syria; that they built ſeveral monaſteries, and, among others, one that bore the name of their maſter; that all the Syrians who were not tainted with hereſy took refuge among them: and that, for this reaſon, the heretics of thoſe times called them Maronites.

Moſheim obſerves, that the ſubjection of the Maronites to the ſpiritual juriſdiction of the Roman pontiff was agreed to upon this expreſs condition, that neither the popes nor their emiſſaries ſhould pretend to change or aboliſh any thing that related to the ancient rites, moral precepts, or religious opinions, of this people: ſo that in reality there is nothing to be found among the Maronites that ſavours of popery, if we except their attachment to the Roman pontiff, who is obliged to pay very dear for their friendſhip. For, as the Maronites live in the utmoſt diſtreſs of poverty, under the tyrannical yoke of the Mahometans, the biſhop of Rome is under the neceſſity of furniſhing them with ſuch ſubſidies as may appeaſe their oppreſſors, procure a ſubſiſtence for their biſhop and clergy, provide all things requiſite for the ſupport of their churches, and the uninterrupted exerciſe of public worſhip, and contribute in general to leſſen their miſery. It is certain that there are Maronites in Syria who ſtill behold the church of Rome with the greateſt averſion and abhorrence; nay, what is ſtill more remarkable, great numbers of that nation reſiding in Italy, even under the eye of the pontiff, oppoſed his authority during the laſt century, and threw the court of Rome into great perplexity. One body of theſe nonconforming Maronites retired into the valleys of Piedmont, where they joined the Waldenſes; another, above 600 in number, with a biſhop and ſeveral eccleſiaſtics at their head, fled into Corſica, and implored the protection of the republic of Genoa againſt the violence of the inquiſitors.

The Maronites have a patriarch, who reſides in the monaſtery of Cannubin, on Mount Libanus, and aſſumes the title of patriarch of Antioch, and the name of Peter, as if he ſeemed deſirous of being conſidered as the ſucceſſor of that apoſtle. He is elected by the clergy and the people, according to the ancient cuſtom; but, ſince their reunion with the church of Rome, he is obliged to have a bull of confirmation from the pope. He keeps a perpetual celibacy, as well as the reſt of the biſhops his ſuffragans: as to the reſt of the eccleſiaſtics, they are allowed to marry before ordination; and yet the monaſtic life is in great eſteem among them. Their monks are of the order of St Anthony, and live in the moſt obſcure places in the mountains, far from the commerce of the world.

As to their faith, they agree in the main with the reſt of the eaſtern church. Their prieſts do not ſay maſs ſingly; but all ſay it together, ſtanding round the altar. They communicate in unleavened bread; and the laity have hitherto partaken in both kinds, though the practice of communicating in one has of late been getting footing, having been introduced by little and little. In Lent they eat nothing, unleſs it be two or three hours before ſunriſing: their other faſtings are very numerous.

To MAROON, to put one or more ſailors aſhore upon a deſolate iſland, under pretence of their having committed ſome great crime. This deteſtable expedient has been too often practiſed by ſome inhuman commanders of ſhips.

MAROT (Clement), the beſt French poet of his time, was born at Cahors in 1495; and was the ſon of John Marot, valet de chambre to Francis I. and poet to Queen Anne of Bretagne. He enjoyed his father's place of valet de chambre to Francis I. and was page to Margaret of France wife to the duke of Alençon. In 1521 he followed that prince into Italy, and was wounded and taken priſoner at the battle of Pavia; but at his return to Paris was accuſed of hereſy, and thrown into priſon, from whence he was delivered by the protection of King Francis I. He at length retired to the queen of Navarre, then to the ducheſs of Ferrara, and in 1536 returned to Paris: but declaring openly for the Calviniſts, he was obliged to fly to Geneva; which he at length left, and retiring to Piedmont, died at Turin in 1544, aged 50. His verſes are agreeably filled with natural beauties. La Fontaine acknowledged himſelf his diſciple, and contributed greatly to reſtore to vogue the works of this ancient poet. Marot, beſides his other works, has tranſlated part of the Pſalms into verſe, which was continued by Beza, and are ſtill ſung in the Proteſtant churches abroad.—*Michael Marot*, his ſon, was alſo the author of ſome verſes; but they are not comparable to thoſe of *John*, and much leſs to thoſe of *Clement Marot*.—The works of the three *Marots* were collected and printed together at the Hague in 1731, in 3 vols. 4to, and in 6 vols. 12mo.

MARPURG, a ſtrong and conſiderable town of Germany, in the Upper Rhine, and in the landgravate of Heſſe Caſſel, with an univerſity, a caſtle, a palace, a handſome ſquare, and a magnificent townhouſe. It is ſeated on the river Lohn, in a pleaſant country, 15 miles ſouth of Waldeck, and 47 ſouth-eaſt of Caſſel. E. Long. 8. 53. N. Lat. 50. 42.

MARPURG, a handſome town of Germany, in Lower Styria, ſeated on the river Drave, 25 miles ſouth-weſt of Gratz, and 60 north-eaſt of Laubach. E. Long. 16. 10. N. Lat. 46. 42.

MARQUARD, FREHER, an eminent German civilian, born at Augſburg in 1565. He ſtudied at Bourges, under the learned Cujas; and acquired great ſkill in polite literature, and in the laws. At his return to Germany, he became counſellor to the elector Palatine, and profeſſor of law at Heidelberg; and was afterwards ſent by the elector Frederic IV. as his miniſter, into Poland, to Mentz, and ſeveral other courts. He died at Heidelberg in 1614. He wrote many works which are eſteemed; the principal of which are, 1. *De re monetaria veterum Romanorum, et hodierni apud Germanos imperii.* 2. *Rerum Bohemicarum ſcriptores.* 3. *Rerum Germanicarum ſcriptores.* 4. *Corpus hiſtoriæ Franciæ*, &c.

MARQUE, or *Letters of Marque*, in military affairs, are letters of repriſal, granting the ſubjects of one prince or ſtate liberty to make repriſals on thoſe of another.—They are ſo called from the German *marcke* "limit, frontier;" as being *jus conceſſum in alterius principis marchas, ſeu limites tranſeundi, ſibique jus faciendi*; *i. e.* a liberty of paſſing the limits or frontiers of another prince, and doing one's ſelf juſtice.

Letters of marque among us are extraordinary commiſſions granted by authority for reparation to merchants taken and deſpoiled by ſtrangers at ſea; and reprizals is only the retaking, or taking of one thing for another. The form in theſe caſes is, the ſufferer muſt firſt apply to the lord privy-ſeal, and he ſhall make out letters of requeſt under the privy-ſeal; and if, after ſuch requeſt of ſatisfaction made, the party required do not, within convenient time, make due ſatisfaction or reſtitution to the party grieved, the lord chancellor ſhall make him out letters of marque under the great ſeal; and by virtue of theſe he may attack and ſeize the property of the aggreſſor nation, without hazard of being condemned as a robber or pirate.

MARQUESAS ISLANDS, the name of certain iſlands in the South ſea, lying between 8 and 10 degrees of ſouth latitude, and between 139 and 140 degrees of weſt longitude. They are five in number, viz. La Magdalena, St Pedro, La Dominica, Santa Chriſtina, and Hood iſland. All the natives of theſe iſlands may be ſuppoſed to be of the ſame tribe. Thoſe ſpots that are fit for culture are very populous; but as every iſland is very mountainous, and has many inacceſſible and barren rocks, it is to be doubted whether the whole population of this group amounts to 50,000 perſons. The Spaniards, who firſt viſited here, found the manners of this people gentle and inoffenſive; but theſe qualities did not prevent thoſe who landed from wantonly butchering ſeveral of the natives at Magdalena.

The inhabitants of theſe iſlands collectively, ſays Captain Cook, are, without exception, the fineſt race of people in the South ſea. For ſymmetry of ſhape, and regular features, they perhaps ſurpaſs all other nations. Not a ſingle deformed or ill-proportioned perſon was ſeen on the iſland; all were ſtrong, tall, well-limbed, and remarkably active. The men are about five feet ten or ſix feet high: their teeth are not ſo good, nor are their eyes ſo full and lively, as thoſe of many other nations: their hair is of many colours, but none red; ſome have it long, but the moſt general cuſtom is to wear it ſhort, except a bunch on each ſide the crown, which they tie in a knot: their countenances are pleaſing, open, and full of vivacity: they are of a tawny complexion, which is rendered almoſt black by punctures over the whole body. They were entirely naked, except a ſmall piece of cloth round their waiſt and loins. The punctures were diſpoſed with the utmoſt regularity, ſo that the marks on each leg, arm, and cheek, were exactly ſimilar. The women, in two days time, began to appear in conſiderable numbers, and the ſailors found them not leſs kind than thoſe of the other iſlands which they had viſited: they were inferior to the men in ſtature, but well proportioned: their general colour was brown; no punctures were obſerved upon them; they wore a ſingle piece of cloth made of the mulberry bark, which covered them from the ſhoulders to the knees.

The principal head-dreſs uſed in the iſlands, and what appears to be their chief ornament, is a ſort of broad fillet, curiouſly made of the fibres of the huſks of cocoa nuts; in the front is fixed a mother-of-pearl ſhell, wrought round to the ſize of a tea-ſaucer; before that another ſmaller, of very fine tortoiſeſhell, perforated into curious figures; alſo before, and in the centre of that, is another round piece of mother-of-pearl, about the ſize of half a crown; and before this another piece of perforated tortoiſeſhell, the ſize of a ſhilling. Beſides this decoration in front, ſome have it alſo on each ſide, but in ſmall pieces; and all have fixed to them the tail feathers of cocks, or tropic birds, which, when the fillet is tied on, ſtand upright, ſo that the whole together makes a very ſightly ornament. They wear round the neck a kind of ruff or necklace made of light wood, the outward and upper ſides covered with ſmall peas, which are fixed on with gum; they alſo wear ſome ſmall bunches of human hair faſtened to a ſtring, and tied round the legs and arms. But all the above ornaments are ſeldom ſeen on the ſame perſon. All theſe ornaments, except the laſt, they freely parted with for a trifling conſideration; but the human hair they valued very higly, though theſe bunches were the uſual reliques of many a one. It is probable, that theſe were worn in remembrance of their deceaſed relations, and therefore were looked upon with ſome veneration; or they may be the ſpoils of their enemies, worn as the honourable teſtimonies of victory. However, a large nail, or ſomething which ſtruck their eyes, commonly got the better of their ſcruples. The king, or chief of the iſland, came to viſit Captain Cook: he was the only one ſeen completely dreſſed in this manner. Their ordinary ornaments are necklaces, and amulets made of ſhells, &c. All of them had their ears pierced, though none were ſeen with ear-rings. The king had not much reſpect paid him by his attendants: he preſented Captain Cook with ſome fruit and hogs; and acquainted him that his name was *Honoo*, and that he was *hakaiei*, which title ſeems to correſpond with the *aree* of Otaheite, and *arekee* of the Friendly iſles. Their dwellings are in the valleys, and on the ſides of the hills near their plantations. They are built in the ſame manner as thoſe at Otaheite, which will be particularly deſcribed when we ſpeak of that iſland; but they are much meaner, and are only covered with the leaves of the bread-fruit tree: in general, they are built on a ſquare or oblong pavement of ſtone, raiſed ſome height above the level of the ground; they likewiſe have ſuch pavement near their houſes, on which they ſit to eat and amuſe themſelves. Along the uppermoſt edge of the mountain a row of ſtakes or paliſadoes, cloſely connected together, were ſeen like a fortification, in which, by the help of glaſſes, appeared ſomething like huts, which ſeemed to bear a great reſemblance to the hippas of New Zealand, which will be deſcribed in ſpeaking of that country. Their canoes reſemble thoſe of Otaheite, but not ſo large; their heads had commonly ſome flat upright piece, on which the human face was coarſely carved; and their ſails were made of mats, triangular in ſhape, and very broad at the top: the paddles which they uſed were of heavy hard wood; ſhort, but ſharp pointed, and with a knob at the upper end; they were from 10 to 22 feet long, and about 15 inches broad.

Their weapons were all made of the club wood, or caſuarina; and were either plain ſpears about 8 or 10 feet long, or clubs which commonly had a knob at one end. They have alſo ſlings with which they throw ſtones with great velocity, and to a great diſtance, but not with a good aim.

Marqueſas.

The language of theſe people is much nearer to that of Otaheite than any other dialect in the South ſea, except that they could not pronounce the letter *r*.

The only quadrupeds ſeen here were hogs, except rats; here were fowls, and ſeveral ſmall birds in the woods, whoſe notes were very melodious. The chief difference between the inhabitants of the Marqueſas and thoſe of the Society iſlands ſeems to conſiſt in their different degrees of cleanlineſs: the former do not bathe two or three times a-day, nor waſh their hands and face before and after every meal, as the latter do; and they are beſides very ſlovenly in the manner of preparing their meals. Their diet is chiefly vegetable; though they have hogs and fowls, and catch abundance of fiſh at certain times. Their drink is pure water, cocoa nuts being ſcarce here.

It was not long before the propenſity of the natives was diſcovered to be rather to receive than give; for when they had taken a nail as the price of a bread-fruit, the article ſo purchaſed could not be obtained from them. To remove this diſhoneſt diſpoſition, Captain Cook ordered a muſket to be fired over their heads, which terrified them into fair dealing.

Soon after the natives had gathered courage enough to venture on board the ſhip, one of them unfortunately ſtole an iron ſtancheon from the gangway, with which he ſprang into the ſea, and, notwithſtanding its weight, ſwam with it to his canoe, and was making to the ſhore with all ſpeed. A muſket was fired over his head to frighten him back, but to no effect, he ſtill continued to make off with his booty; the whiſtling of another ball over his head was as ineffectual: an officer, leſs patient of ſuch an injury than reaſon and humanity ſhould have taught him to be, levelled a muſket at the poor fellow, and ſhot him through the head. Captain Cook had given orders to fire *over* the canoe, but not to kill any one; he was in a boat, and came up with the canoe ſoon after. There were two men in her: one ſat bailing out the blood and water in a kind of hyſteric laugh; the other, a youth of about 14 or 15 years of age, who afterwards proved to be the ſon of the deceaſed, fixed his eyes on the dead body with a ſerious and dejected countenance. This act of ſeverity, however, did not eſtrange the iſlanders to the ſhip, and a traffic was carried on to the ſatisfaction of both parties; bread-fruit, bananas, plantains, and ſome hogs, were given in exchange for ſmall nails, knives, and pieces of Amſterdam cloth; red feathers of the Amſterdam iſland were greatly eſteemed here. Captain Cook, accompanied with the gentlemen of the ſhip, in their walks about the country, lighted on the houſe which had been the habitation of the man who had been ſhot; there they found his ſon, who fled at their approach: they inquired for his female relations, and were told that they remained at the top of the mountain, to weep and mourn for the dead. Notwithſtanding they were then among the relations of a man who had been killed by them, not the leaſt tokens of animoſity or revenge were diſcernible among the natives.

The weather being extremely hot, the inhabitants made uſe of large fans to cool themſelves, of which great numbers were purchaſed: the fans were formed of a kind of tough bark, or graſs, very firmly and curiouſly plaited, and frequently whitened with ſhell-lime. Some had large feathered leaves of a kind of palm, which anſwered the purpoſe of an umbrella.

Marqueſa

The natives at length became ſo familiar as to mount the ſides of the ſhip in great numbers. They frequently danced upon the decks for the diverſion of the ſailors: their dances very much reſembled thoſe of Otaheite; their muſic too was very much the ſame.

A ſailor having been inattentive to his duty, received ſeveral blows from Captain Cook; on ſeeing which, the natives exclaimed *tape-a hei-te tina*, "he beats his brother." From other inſtances that had occurred, it was clear that they knew the difference between the commander and his people, but at the ſame time they conceived them all brethren; and, ſays Mr Forſter, "to me the moſt natural inference is, that they only applied an idea to us in this caſe, which really exiſted with regard to themſelves; they probably look on themſelves as one family, of which the eldeſt born is the chief or king."

MARQUETRY, INLAID WORK; a curious kind of work, compoſed of pieces of hard fine wood of different colours, faſtened, in thin ſlices, on a ground, and ſometimes enriched with other matters, as tortoiſe-ſhell, ivory, tin, and braſs.

There is another kind of marquetry made, inſtead of wood, of glaſſes of various colours; and a third, where nothing but precious ſtones and the richeſt marbles are uſed: but theſe are more properly called *moſaic work*. See MOSAIC.

The art of inlaying is very ancient; and is ſuppoſed to have paſſed from the eaſt to the weſt, as one of the ſpoils brought to the Romans from Aſia. Indeed it was then but a ſimple thing; nor did it arrive at any tolerable perfection till the 15th century among the Italians: it ſeems, however, to have arrived at its height in the 17th century among the French.

Till John of Verona, a cotemporary with Raphael, the fineſt works of this kind were only black and white, which are what we now call *Moreſcos*; but that religious, who had a genius for painting, ſtained his woods with dyes or boiled oils, which penetrated them. But he went no farther than the repreſenting buildings and perſpectives, which requires no great variety of colours. Thoſe who ſucceeded him, not only improved on the invention of dyeing the woods, by a ſecret which they found of burning them without conſuming, which ſerved exceedingly well for the ſhadows; but had alſo the advantage of a number of fine new woods of naturally bright colours, by the diſcovery of America. With theſe aſſiſtances the art is now capable of imitating any thing; whence ſome call it the *art of painting in wood*.

The ground whereon the pieces are to be ranged and glued, is ordinarily of oak or fir well dried; and to prevent warping, is compoſed of ſeveral pieces glued together. The wood to be uſed, being reduced into leaves, of the thickneſs of a line, is either ſtained with ſome colour, or made black for ſhadow; which ſome effect by putting it in ſand extremely heated over the fire, others by ſteeping it in lime water and ſublimate, and others in oil of ſulphur.—Thus coloured, the contours of the piece are formed according to the parts of the deſign they are to repreſent.

Marquetry.

This laſt is the moſt difficult part of marquetry, and that wherein moſt patience and attention are required. The two chief inſtruments uſed herein are the ſaw and the vice; the one to hold the matters to be formed; the other, to take off from the extremes, according to occaſion. The vice is of wood, having one of its chaps fixed; the other moveable, and is opened and ſhut by the foot, by means of a cord faſtened to a treadle. Its ſtructure is very ingenious, yet ſimple enough.

The leaves to be formed (for there are frequently three or four of the ſame kind formed together) are put within the chaps of the vice, after being glued on the outermoſt part of the deſign whoſe profile they are to follow; then the workman preſſing the treadle, and thus holding faſt the piece, with his ſaw runs over all the outlines of the deſign.—By thus joining and forming three or four pieces together, they not only gain time, but the matter is likewiſe the better enabled to ſuſtain the effects of the ſaw; which, how delicate ſoever it may be, and how lightly ſoever the workman may conduct it, without ſuch a precaution would be apt to raiſe ſplinters, to the ruin of the beauty of the work.

When the work is to conſiſt of one ſingle kind of wood, or of tortoiſe-ſhell, on a copper or tin ground, or *vice verſa*, they only form two leaves on one another, *i.e.* a leaf of metal, and a leaf of wood or ſhell: this they call *ſawing in counter parts*; for by filling the vacuities of one of the leaves by the pieces coming out of the other, the metal may ſerve as a ground to the wood, and the wood to the metal.

All the pieces thus formed with the ſaw, and marked to know them again, and the ſhadow given in the manner already mentioned; they veneer or faſten each in its place on the common ground; uſing for that purpoſe the beſt Engliſh glue.

The whole is put in a preſs to dry, planed over, and poliſhed with the ſkin of the ſea-dog, wax, and ſhave-graſs, as in ſimple veneering; with this difference, however, that in marquetry the fine branches, and ſeveral of the more delicate parts of the figures, are touched up and finiſhed with a graver.

It is the cabinet-makers, joiners, and toymen, among us who work in marquetry: it is the enamellers and ſtone-cutters who deal in moſaic works: the inſtruments uſed in the former are moſtly the ſame with thoſe uſed by the eboniſts.

MARQUIS, a title of honour, next in dignity to that of duke. His office is to guard the frontiers and limits of the kingdom, which were called the *marches*, from the Teutonic word *marche*, a "limit:" as, in particular, were the marches of Wales and Scotland while they continued hoſtile to England. The perſons who had command there, were called *lords marchers*, or *marqueſſes*; whoſe authority was aboliſhed by ſtatute 27 Hen. VIII. c. 27. though the title had long before been made a mere deſign of honour, Robert Vere earl of Oxford being created marquis of Dublin by Richard II. in the eighth year of his reign. A marquis is created by patent; his mantle is double ermine, three doublings and a half; his title is *moſt honourable*; and his coronet has pearls and ſtrawberry leaves intermixed round, of equal height.

MARR, that part of Aberdeenſhire ſituated between the rivers Dee and Don.

MARRACCI, Lewis, a learned Italian, was born at Lucca in Tuſcany in 1612. After having finiſhed his juvenile ſtudies, he entered into the congregation of regular clerks of the mother of God, and diſtinguiſhed himſelf early by his learning and merit. He taught rhetoric ſeven years, and paſſed through ſeveral offices of his order. He applied himſelf principally to the ſtudy of languages, and attained of himſelf the knowledge of the Greek, the Hebrew, the Syriac, the Chaldee, and Arabic; which laſt he taught ſome time at Rome, by the order of Pope Alexander VII. Pope Innocent XI. choſe him for his confeſſor, and placed great confidence in him. He would have advanced him to eccleſiaſtical dignities, if Marracci had not oppoſed him.—Marracci died at Rome in 1700, aged 87.—He was the author of ſeveral pieces in Italian; but the grand work, which has made him deſervedly famous all over Europe, is his edition of the Alkoran, in the original Arabic, with a Latin verſion, notes, and confutation of his own. It was beautifully printed in two vols. folio at Padua in 1698. The Latin verſion of the Alkoran, by Marracci, with notes and obſervations from him and others, and a ſynopſis of the Mahometan religion, by way of introduction, was publiſhed by Heineccius at Leipſic, 1721, in 8vo. Marracci had alſo a hand in the "Biblia ſacra Arabica, ſacræ congregationis de propaganda fide juſſu edita, ad uſum eccleſiarum orientalium," *Romæ*, 1671, in 3 vols. folio.

MARRIAGE, a contract, both civil and religious, between a man and a woman, by which they engage to live together in mutual love and friendſhip for the ends of procreation, &c. See *Moral Philoſophy*.

Marriage is part of the law of nations, and is in uſe among all people. The Romaniſts account it a ſacrament.—The woman, with all her moveable goods, immediately upon marriage, paſſes wholly *in poteſtatem viri*, into the power and diſpoſal of the huſband."

The firſt inhabitants of Greece lived together without marriage. Cecrops, king of Athens, is ſaid to have been the firſt author of this honourable inſtitution among that people. After the commonwealths of Greece were ſettled, marriage was very much encouraged by their laws, and the abſtaining from it was diſcountenanced and in many places puniſhed. The Lacedemonians were very remarkable for their ſeverity towards thoſe who deferred marriage beyond a limited time, as well as to thoſe who wholly abſtained from it. The Athenians had an expreſs law, that all commanders, orators, and perſons intruſted with any public affair, ſhould be married men. Polygamy was not commonly tolerated in Greece. The time of marriage was not the ſame in all places. The Spartans were not permitted to marry till they arrived at their full ſtrength; the reaſon aſſigned for which cuſtom by Lycurgus was, that the Spartan children might be ſtrong and vigorous; and the Athenian laws are ſaid to have once enacted, that men ſhould not marry till 35 years of age. The ſeaſon of the year which they preferred for this purpoſe was the winter, and particularly the month of January, called Gamelion. The Greeks thought it ſcandalous to contract marriage within certain degrees of conſanguinity; whilſt moſt of the barbarous nations allowed inceſtuous mixtures.

Moſt of the Grecian ſtates, eſpecially ſuch as made any figure, required their citizens ſhould match with none but citizens, and the children were not allowed to marry without the conſent of their parents. The uſually ceremony in promiſing fidelity was kiſſing each other, or giving their right hands, which was a general form of ratifying all agreements. Before the marriage could be ſolemnized, the gods were to be conſulted, and their aſſiſtance implored by prayers and ſacrifices, which were offered to ſome of the deities that ſuperintended theſe affairs, by the parents or neareſt relations of the perſons to be married. When the victim was opened, the gall was taken out and thrown behind the altar, as being the ſeat of anger and malice, and therefore the averſion of all the deities who had the care of love, as well as thoſe who became their votaries. For the particularities relating to the bride and bridegroom, ſee BRIDE and BRIDEGROOM.

The Romans, as well as the Greeks, diſallowed of polygamy. A Roman might not marry any woman who was not a Roman. Among the Romans, the kalends, nones, and ides of every month were deemed unlucky for the celebration of marriage, as was alſo the feaſt of the *parentalia*, and the whole month of May. The moſt happy ſeaſon in every reſpect was that which followed the ides of June.

The Roman laws ſpeak of ſecond marriages in very hard and odious terms: *Matre jam ſecundis nuptiis funeſtata*, L. iii. C. de ſec. nuptiis. By theſe laws it was enacted, that the effects of the huſband or wife deceaſed ſhould paſs over to the children, if the ſurvivor ſhould marry a ſecond time. By the law *Hac edictali* (Cod. de ſec. nupt.), the ſurvivor, upon marrying a ſecond time, could not give the perſon he married a portion more than equal to that of each of the children. In the primitive church the reſpect to chaſtity was carried ſo high, that a ſecond marriage was accounted no other than a lawful whoredom, or a ſpecies of bigamy; and there are ſome ancient canons which forbid the eccleſiaſtics from being preſent at ſecond marriages.

Marriage, by the Moſaic law, was ſubject to ſeveral reſtrictions: thus by Levit. chap. xviii. ver. 16. a man was forbid to marry his brother's widow unleſs he died without iſſue; in which caſe it became enjoined as a duty. So it was forbid to marry his wife's ſiſter, while ſhe was living, ver. 18.; which was not forbidden before the law, as appears from the inſtance of Jacob.

The ancient Roman law is ſilent on this head; and Papinian is the firſt who mentions it, on occaſion of the marriage of Caracalla. The lawyers who came after him ſtretched the bonds of affinity ſo far, that they placed adoption on the ſame foot with nature.

Affinity, according to the modern canoniſts, renders marriage unlawful to the fourth generation, incluſive; but this is to be underſtood of direct affinity, and not of that which is ſecondary or collateral. [illegible] [illegible]. It is farther to be obſerved, that the impediment of affinity does not only follow an affinity contracted by lawful matrimony, but alſo that contracted by a criminal commerce; with this difference, that this laſt does extend beyond the ſecond generation; whereas the other, as has been obſerved, reaches to the fourth.

In Germany they have a kind of marriage called *morganatic*, wherein a man of quality contracting with a woman of inferior rank, he gives her the left hand in lieu of the right; and ſtipulates in the contract that the wife ſhall continue in her former rank or condition; and that the children born of them ſhall be of the ſame, ſo that they become baſtards as to matters of inheritance, though they are legitimate in effect. They cannot bear the name or arms of the family. None but princes and great lords of Germany are allowed this kind of marriage. The univerſities of Leipſic and Jena have declared againſt the validity of ſuch contracts; maintaining that they cannot prejudice the children, eſpecially when the emperor's conſent intervenes in the marriage.

The Turks have three kinds of marriages, and three ſorts of wives; *legitimate*, *wives in kebin*, and *ſlaves*. They marry the firſt, hire the ſecond, and buy the third.

Among all the ſavage nations, whether in Aſia, Africa, or America, the wife is commonly bought by the huſband from her father or thoſe other relations who have an authority over her; and the concluſion of a bargain for this purpoſe, together with the payment of the price, has therefore become the uſual form or ſolemnity in the celebration of their marriages. The Hebrews alſo purchaſed their wives by paying down a competent dowry for them; and Ariſtotle makes it one argument to prove that the ancient Grecians were an uncivilized people, becauſe they uſed to buy their wives; and in proportion as they laid aſide their barbarous manners they left off this practice.

The Engliſh law conſiders marriage in no other light than as a civil contract; the holineſs of the matrimonial ſtate being left entirely to the eccleſiaſtical law, to which it pertains, to puniſh or annul inceſtuous or other unſcriptural marriages. The law allows marriage to be good and valid, where the parties at the time of making it were willing and able to contract, and actually did contract, in the proper forms and ſolemnities required by law. The diſabilities for contracting are of two ſorts: firſt, ſuch as are canonical, and therefore ſufficient by the eccleſiaſtical laws to void the marriage in the ſpiritual court; ſuch as pre-contract, conſanguinity or relation by blood; and affinity, or relation by marriage, and ſome particular corporal infirmities. But theſe diſabilities in our law do not make the marriage *ipſo facto* void, but voidable only by ſentence of ſeparation; and marriages are eſteemed valid to all civil purpoſes, unleſs ſuch ſeparation is actually made during the life of the parties. Thus when a man had married his firſt wife's ſiſter, and after her death the biſhop's court was proceeding to annul the marriage and baſtardiſe the iſſue, the court of king's bench granted a prohibition *quoad hoc*; but permitted them to proceed to puniſh the huſband for inceſt.

By 32 Hen. VIII. c. 38. it is declared, that all perſons may lawfully marry but ſuch as are prohibited by God's law, &c. And that nothing (God's law excepted) ſhall impeach any marriage but within the Levitical degrees [illegible] in the 18th chapter of Leviticus, and are illuſtrated by Lord Coke in this manner: a man may not marry his mother, father's ſiſter, mother's ſiſter, ſiſter, daughter, daughter of his ſon or daughter, father's wife, uncle's wife, father's wife's daughter, brother's wife, wife's ſiſter, ſon's wife or wife's daughter, and daughter of his wife's ſon or daughter. And a woman may not marry her father, father's brother, mother's brother, brother, ſon, ſon of her huſband's ſon or daughter, mother's huſband, aunt's huſband, ſiſter's huſband, huſband's brother, and ſon of her huſband's ſon or daughter. By the civil law firſt couſins are allowed to marry; but by the canon law both firſt and ſecond couſins are prohibited. Therefore when it is vulgarly ſaid that firſt couſins may marry but ſecond couſins cannot, this probably aroſe by confounding theſe two laws: for firſt couſins may marry by the civil law, and ſecond couſins cannot by the canon law. But by the foreſaid ſtat. 32 Hen. VIII. c. 38. it is clear, that both firſt and ſecond couſins may marry. By the ſame ſtatute all impediments ariſing from precontracts to other perſons were aboliſhed, and declared of none effect unleſs they had been conſummated with bodily knowledge; in which caſe the canon law holds ſuch contract to be a marriage *de facto*. But this branch of the ſtatute was repealed by 2 and 3 Ed. VI. c. 23. How far the act of 26 Geo. II. c. 33 (which prohibits all ſuits in eccleſiaſtical courts to compel a marriage in conſequence of any contract) may collaterally extend to revive this clauſe of Henry VIII.'s ſtatute, and aboliſh the impediment of precontract, Judge Blackſtone leaves to be conſidered by the canoniſts. We ſhall here obſerve, that on a promiſe of marriage, if it be mutual on both ſides, damages may be recovered in caſe either party refuſes to marry; and though no time for the marriage is agreed on, if the plaintiff avers that he offered to marry the defendant who refuſed it, an action is maintainable for the damages; but no action ſhall be brought upon any agreement except it is in writing, and ſigned by the party to be charged. The canonical hours for celebrating marriage are from 8 to 12 in the forenoon.

The other ſort of diſabilities are thoſe which are created, or at leaſt enforced, by the municipal laws. Theſe civil diſabilities make the contract void *ab initio*, by rendering the parties incapable of forming any contract at all. The firſt legal diſability is a prior marriage, or having another huſband or wife living; in which caſe, beſides the penalties conſequent upon it as a felony, the ſecond marriage is to all intents and purpoſes void. See BIGAMY and POLYGAMY.

The next legal diſability is want of age: therefore if a boy under 14, or a girl under 12 years of age, marries, when either of them comes to the age of conſent, they may diſagree and declare the marriage void, without any divorce or ſentence in the ſpiritual court. However, in our law it is ſo far a marriage, that if at the age of conſent they agree to continue together, they need not be married again. Another incapacity ariſes from want of conſent of parents or guardians. By ſeveral ſtatutes, viz. 6 and 7 W. III. c. 6. 7 & 8 W. III. c. 35. [illegible] laid on every clergyman who marries a couple either without publication of banns, which may give notice to parents or guardians, or without a licenſe, to obtain which the conſent of parents or guardians muſt be ſworn to. And by 4 and 5 Ph. and M. c. 8. whoſoever marries a woman child under the age of 16 years, without conſent of parents or guardians, ſhall be ſubject to fine or five years impriſonment; and her eſtate during her huſband's life ſhall be enjoyed by the next heir. Thus alſo in France the ſons cannot marry without conſent of parents till 30 years of age, nor the daughters till 25; and in Holland the ſons are at their own diſpoſal at 25, and the daughters at 20. And by the marriage act, viz. 26 Geo. II. c. 33. it is enacted, that all marriages celebrated by licenſe (for banns ſuffice not), where either of the parties is under 21, not being a widow or widower, without the conſent of the father, or if he be not living, of the mother or guardians, ſhall be abſolutely void. However, proviſion is made where the mother or guardian is *non compos*, beyond ſea, or unreaſonably froward, to diſpenſe with ſuch conſent at the diſcretion of the lord chancellor; but no proviſion is made in caſe the father ſhould labour under any mental or other incapacity. A fourth incapacity is want of reaſon. It is provided by 15 Geo. II. c. 30. that the marriage of lunatics and ſons under phrenſies (if found lunatics under a commiſſion or committed to the care of truſtees by any act of parliament) before they are declared of ſound mind by the lord chancellor, or the majority of ſuch truſtees, ſhall be totally void. Laſtly, The parties muſt not only be willing and able to contract, but muſt actually contract themſelves in due form of law, to make it a good civil marriage. Any contract made *per verba de præſenti*, or in words of the preſent tenſe, and in caſe of cohabitation *per verba de futuro* alſo between perſons able to contract, was before the late act deemed a valid marriage to many purpoſes, and the parties might be compelled in the ſpiritual courts to celebrate it *in facie eccleſiæ*. But theſe verbal contracts are now of no force to compel a future marriage. Nor is any marriage at preſent valid that is not celebrated in ſome pariſh church, or public chapel, unleſs by diſpenſation from the archbiſhop of Canterbury. It muſt alſo be preceded by publication of banns, or by licenſe from the ſpiritual judge. A marriage in purſuance of banns muſt be ſolemnized in one of the churches or chapels where the banns were publiſhed. No parſon, vicar, &c. ſhall be obliged to publiſh banns of matrimony, unleſs the perſons to be married ſhall, ſeven days before the time required for the firſt publication, deliver to him a notice in writing of their true names, and of the houſe or houſes of their reſpective abode within ſuch pariſh, &c. and of the time that they have dwelt in ſuch houſe or houſes. And the ſaid banns ſhall be publiſhed upon three Sundays preceding the ſolemnization of marriage during the time of public ſervice: in caſe the parents or guardians, or either of the parties who ſhall be under the age of 21 years, ſhall openly and publicly declare, or cauſe to be declared, in the church or chapel where the banns ſhall be ſo publiſhed, at the time of ſuch publication, their diſſent to ſuch marriage, ſuch publication of banns ſhall be void. And when the parties dwell in divers pariſhes, the curate of the one pariſh ſhall not ſolemnize matrimony between them, without a certificate of the banns being thrice aſked from the curate in the other pariſh. A marriage in purſuance of a licenſe (except a ſpecial licenſe), muſt be ſolemnized in the church or chapel where the licenſe is granted: and no licenſe of marriage ſhall be granted by any archbiſhop, biſhop, &c. to ſolemnize any marriage in any other church, &c. than in the pariſh church, &c. within which the uſual place of abode of one of the parties ſhall have been for four weeks immediately before the granting ſuch licenſe. By the ſame ſtatute all marriages ſhall be ſolemnized in the preſence of two credible witneſſes at the leaſt, beſides the miniſter, who ſhall ſign their atteſtation thereof: and immediately after the celebration of every marriage, an entry thereof ſhall be made in the pariſh regiſter, expreſſing that the ſaid marriage was celebrated by banns or licenſe; and if both or either of the parties be under age, with conſent of the parents or guardians, as the caſe ſhall be; ſigned by the miniſter, and alſo by the parties married, and atteſted by the two witneſſes preſent. It is held to be alſo eſſential to a marriage, that it be performed by a perſon in orders; though the intervention of a prieſt to ſolemnize this contract is merely *juris poſitivi* and not *juris naturalis aut divini*: it being ſaid that Pope Innocent III. was the firſt who ordained the celebration of marriage in the church, before which it was totally a civil contract. And in the times of the grand rebellion, all marriages were performed by the juſtices of the peace; and theſe marriages were declared valid without any freſh ſolemnization, by 12 Car. II. c. 33. But as the law now ſtands, we may upon the whole collect, that no marriage by the temporal law is *ipſo facto* void, that is celebrated by a perſon in orders; in a pariſh church, a public chapel, or elſewhere, by a ſpecial diſpenſation; in purſuing of banns or a licenſe; between ſingle perſons; conſenting; of ſound mind; and of the age of 21 years; or of the age of 14 in males and 12 in females, with conſent of parents or guardians, or without it, in caſe of widowhood. And no marriage is voidable by the eccleſiaſtical law after the death of either of the parties; nor during their lives, unleſs for the canonical impediments of precontract, if that indeed ſtill exiſts; of conſanguinity; and of affinity or corporal imbecillity ſubſiſting previous to the marriage.

By 26 Geo. II. c. 33. the ſubſtance of which has been already recited, if any perſon ſhall ſolemnize matrimony in any other place than a church, &c. where banns have been uſually publiſhed, unleſs by ſpecial licenſe, or without publication of banns, unleſs licenſe of marriage be firſt obtained from ſome perſon having authority to grant the ſame, every ſuch perſon knowingly ſo offending ſhall be guilty of felony, and tranſported for 14 years; the proſecution to be within three years. By the ſame ſtatute, to make a falſe entry into a marriage regiſter; to alter it when made; to forge or counterfeit ſuch entry, or a marriage licenſe, or aid and abet ſuch forgery; to utter the ſame as true, knowing it to be counterfeit; or to deſtroy or procure the deſtruction of any regiſter in order to vacate any marriage, or ſubject any perſon to the penalties of this act; all theſe offences, knowingly and wilfully committed, ſubject the party to the guilt of felony without benefit of clergy. But this act doth not extend to the marriages of the royal family; nor to Scotland; nor to any marriages among the people called *Quakers*, or among perſons profeſſing the Jewiſh religion, where both the parties are Quakers or Jews reſpectively; nor to any marriages beyond the ſeas.

In Scotland, the parties living together as huſband and wife, or declaring themſelves ſo before witneſſes, makes a valid though informal marriage. See Law, Part III. N° 160.

For the proportions which marriages bear to births, and births to burials, in ſeveral parts of Europe, Mr Derham gives us the following table.

Names of Places.	*Marriages to Births, as*	*Births to Burials, as*
England in general - - -	1 to 4.63	1.12 to 1
London - - -	1 to 4	1. to 1.1
Hantſhire, from 1569 to 1658 - -	1 to 4	1.2 to 1
Tiverton in Devonſhire from 1656 to 1664 -	1 to 3.7	1.26 to 1
Cranbrook in Kent, from 1560 to 1649 -	1 to 3.9	1.6 to 1
Aynho, in Northamptonſhire, for 118 years -	1 to 6	1.6 to 1
Upminſter in Eſſex, for 100 years - -	1 to 4.6	1.8 to 1
Franckfort on the Main, in 1695 - -	1 to 3.7	1.2 to 1
Old, Middle, and Lower Marck, in 1698 -	1 to 3.7	1.9 to 1
Dominions of the elector of Brandenburg, in 1698	1 to 3.7	1.5 to 1
Breſlaw in Sileſia, from 1687 to 1691 - -	— — —	1.6 to 1
Paris, in 1670, 1671, 1672 - - -	1 to 4.7	1.6 to 1

The following TABLE, *similar to the preceding, is formed from the observations collected and referred to by Dr Price.*

Names of Places.	*Marriages to Births, as*	*Births to Burials, as*
London, annual medium from 1716 to 1726 -	— — —	18,000 to 26,529, or 1 to 1.4, &c.
———————— from 1759 to 1768 -	— — —	15,710 to 22,956, or 1 to 1.4, &c.
Northampton town, ditto, from 1741 to 1770 - -	— — —	155 to 191, or 1 to 1.2, &c.
Norwich, ditto, from 1740 to 1769 - -	— — —	1057 to 1206, or 1 to 1.1, &c.
Shrewsbury, ditto, from 1762 to 1768 - -	— — —	321 to 349, or 1 to 1.09, &c.
Manchester and Salford, inclusive of Ardwick, -		
Ditto, from 1755 to 1758 - - -	— — —	753 to 743. ————
Ditto, ditto, including dissenters, from 1768 to 1772	— — —	1098 to 958, or 1.14, &c. to 1.
Gainſborough in Lincolnſhire, ditto, from 1752 to 1771	1 to 3.7	126 to 105, or 1.2 to 1.
Madeira, ditto, from 1759 to 1766 - -	1 to 4.63	2201 to 1293, or 1.7 to 1.
Boston in New England, from 1731 to 1752 -	— — —	535 to 628, or 1 to 1.17, &c.
Christiania in Norway, in 1761 - -	— — —	11,024 to 6929, or 1.5 to 1.
Paris, medium of some of the last years - -	1 to 4.3	19,100 to 19,400, or 1 to 1.01, &c.
Vienna, annual medium from 1757 to 1769 -	— — —	5600 to 6000, or 1 to 1.1, &c.
Amsterdam, ditto, for some of the last years -	1 to 1.9, &c.	4600 to 8000, or 1 to 1.7, &c.
Copenhagen, ditto - - -	1 to 3.74 &c.	2700 to 3300, or 1 to 1.2, &c.
Berlin, ditto, for five years, ending at 1759 -	1 to 3.9, &c.	3855 to 5254, or 1 to 1.3, &c.
Breslaw, ditto, from 1633 to 1734 - -	— — —	1089 to 1250, or 1 to 1.15, &c.
———, ditto, from 1717 to 1725 - -	— — —	1252 to 1307, or 1 to 1.2, &c.
Rome, ditto, from 1759 to 1761 - - -	— — —	5167 to 7153, or 1 to 1.3, &c.
Vaud in Switzerland, ditto, for 10 years before 1766	1 to 3.9	3155 to 2504, or 1.2, &c. to 1.

For an account of the numbers of male and female ſtillborn children and chryſoms, and of boys and girls under ten, of married men and married women, and of widows and widowers, who died for a courſe of years at Vienna, Breſlaw, Dreſden, Leipſic, Ratiſbon, and ſome other towns in Germany, ſee Phil. Tranſ. Abr. vol. vii. part iv. p. 46, &c.

The reader may find many curious calculations and remarks relating to this ſubject in Dr Price's excellent work, entitled, Obſervations on Reverſionary Payments. From the preceding table it appears, that marriages, one with another, do each produce about four births, both in England and other parts of Europe. Dr Price obſerves, that the births at Paris, as may be ſeen in the table, are above four times the weddings; and therefore it may ſeem, that in the moſt healthy country ſituations, every wedding produces above four children; and though this be the caſe in Paris, for reaſons which he has given, he has obſerved nothing like it in any other great town. He adds, that from comparing the births and weddings in countries and towns where regiſters of them have been kept, it appears, that in the former, marriages one with another ſeldom produce leſs than four children each; generally between four and five, and ſometimes above five; but in towns ſeldom above four, generally between three and four, and ſometimes under three. It is neceſſary to be obſerved here, that though the proportion of annual births to weddings has been conſidered as giving the true number of children derived from each marriage, taking all marriages one with another: yet this is only true, when, for many years, the births and burials have kept nearly equal. Where there is an exceſs of the births occaſioned by an increaſe, the proportion of annual births to weddings muſt be leſs than the proportion of children derived from each marriage; and the contrary muſt take place where there is a decreaſe: and by Mr King's computation, about one in one hundred and four perſons marry; the number of people in England being eſtimated at five millions and a half, whereof about forty-one thouſand annually marry.

In the diſtrict of Vaud in Switzerland, the married are very nearly a third part of the inhabitants.

Major Graunt and Mr King diſagree in the proportions between males and females, the latter making 10 males to 13 females in London; in other cities and towns, and in the villages and hamlets, 100 males to 99 females: but Major Graunt, both from the London and country bills, computes, that there are in England 14 males to 13 females; whence he juſtly infers, that the Chriſtian religion, prohibiting polygamy, is more agreeable to the law of nature than Mahometaniſm and others that allow it.

This proportion of males to females Mr Derham thinks pretty juſt, being agreeable to what he had obſerved himſelf. In the hundred years, for inſtance, of his own pariſh regiſter of Upminſter, though the burials of males and females were nearly equal, being 633 males and 623 females in all that time; yet there were baptized 709 males and but 675 females, which is 13 females to 13.7 males.

From a regiſter kept at Northampton for 28 years, from 1741 to 1770, it appears, that the proportion of males to females that were born in that period is 2361 to 2288, or nearly 13.4 to 13. However, though more males are born than females, Dr Price has ſufficiently ſhown, that there is a conſiderable difference between the probabilities of life among males and females in favour of the latter, ſo that [illegible]

[illegible] the greater mortality of [illegible] as well as among males of all ages, the fact cannot be accounted for merely by their being more subject to untimely deaths by various accidents, and by their being addicted to the excesses and irregularities which shorten life. Mr Kersseboom informs us, that during the course of 125 years in Holland, females have in all accidents of age lived about three or four years longer than the ſame number of males. In ſeveral towns of Germany, &c. it appears that of [illegible] married perſons who had died, the proportion of married men who died to the married women was 3 to 2; and in Breſlaw for eight years, as 5 to 3. In all Pomerania, during nine years, from 1748 to 1756, this proportion was nearly 15 to 11. Among the miniſters and profeſſors in Scotland, 20 married men die to 12 married women at a medium of 27 years, or in the proportion of 5 to 3; ſo that there is the chance of 3 to 2, and in ſome circumſtances even a greater chance, that the woman ſhall be the ſurvivor of a marriage, and not the man; and this difference cannot be accounted for merely by the difference of age between huſbands and their wives, without admitting the greater mortality of males. In the diſtrict of Vaud in Switzerland, it appears, that half the females do not die till the age of 46 and upwards, though half the males die under 36. It is likewiſe an indiſputable fact, that in the beginning of life, the rate of mortality among males is much greater than among females.

From a table formed by Dr Price, from a regiſter kept for 20 years at Gainſborough, it appears, that of thoſe who lived to 80, the major part, in the proportion of 49 to 32, are females. Mr Deparcieux at Paris, and Mr Wargentin in Sweden, have farther obſerved, that not only women live longer than men, but that married women live longer than ſingle women. From ſome regiſters examined by Mr Muret in Switzerland, it appears, that of equal numbers of ſingle and married women between 15 and 25, more of the former died than of the latter, in the proportion of 2 to 1.

With reſpect to the difference between the mortality of males and females, it is found to be much leſs in country pariſhes and villages than in towns; and hence it is inferred, that human life in males is more brittle than in females, only in conſequence of adventitious cauſes, or of ſome particular debility, that takes place in poliſhed and luxurious ſocieties, and eſpecially in great towns.

From the inequality above ſtated between the males and females that are born, it is reaſonable to infer, that every man ought to have but one wife; and yet that every woman without polygamy may have a huſband: this ſurpluſage of males above females being ſpent in the dangers of war, the ſea, &c. from which the women are exempt.

Perhaps, ſays Dr Price, it might have been obſerved with more reaſon, that this proviſion had in view that particular weakneſs or delicacy in the conſtitution of males which makes them more ſubject to mortality; and which conſequently renders it neceſſary that more of them ſhould be produced, in order to preſerve in the world a due proportion between the two ſexes.

[illegible] of Providence [illegible] by Dr Arbuthnot; who ſuppoſes Thomas to lay againſt John, that for 82 years running more males ſhall be born than females; and giving all allowances in the computation to Thomas's ſide, he makes the odds againſt Thomas, that it does not ſo happen, to be near five millions of millions of millions of millions to one; but for ages of ages, according to the world's age, to be near an infinite number to one.

Marriag[e]

According to Mr Kerſſeboom's obſervations, there are about 325 children born from 100 marriages.

Mr Kerſſeboom, from his obſervations, eſtimates the duration of marriages, one with another, as in the following table.

Thoſe whoſe ages, taken together, make

40, live together between	24 and	25 years.
50	22	23
60	23	24
70	19	20
80	17	18
90	14	15
100	12	13

Phil. Tranſ. Nº 468. ſect. iii. p. 319.

Dr Price has ſhown, that on De Moivre's hypotheſis, or that the probabilities of life decreaſe uniformly (ſee *Complement of Life*), the duration of ſurvivorſhip is equal to the duration of marriage, when the ages are equal; or, in other words, that the expectation of two joint lives, the ages being equal, is the ſame with the expectation of ſurvivorſhip; and, conſequently, the number of ſurvivors, or (which is the ſame, ſuppoſing no ſecond marriages) of widows and widowers, alive together, which will ariſe from any given ſet of ſuch marriages conſtantly kept up, will be equal to the whole number of marriages, or half of them (the number of widows in particular) equal to half the number of marriages. Thus, the expectation of two joint lives, both 40, is the third of 46 years, or their complement, i. e. 15 years and 4 months; and this is alſo the expectation of the ſurvivor. That is, ſuppoſing a ſet of marriages between perſons all 40, they will one with another laſt juſt this time, and the ſurvivors will laſt the ſame time. In adding together the years which any great number of ſuch marriages, and their ſurvivorſhips, have laſted, the ſums would be found to be equal. It is obſerved farther, that if the number expreſſing the expectation of ſingle or joint lives, multiplied by the number of ſingle or joint lives whoſe expectation it is, be added annually to a ſociety or town, the ſum gives the whole number living together, to which ſuch an annual addition would in time grow: thus, ſince 19, or the third of 57, is the expectation of two joint lives whoſe common age is 29, or common complement 57, 20 marriages every year between perſons of this age would in 57 years grow to 20 times 19, or 380 marriages always exiſting together. The number of ſurvivors alſo ariſing from theſe marriages, and always living together, would in twice 57 years increaſe to the ſame number. Moreover, the particular proportion that becomes extinct every year, out of the whole number conſtantly exiſting together of ſingle or joint lives, muſt, wherever this number undergoes no variation, be exactly the ſame with the expectation of thoſe lives at the time when their exiſtence commenced. Thus, if it were

ſuparriage. found that a 19th part of all the marriages among any body of men whoſe numbers do not vary, are diſſolved every year by the deaths of either the huſband or wife, it would appear, that 19 was at the time they were contracted, the expectation of theſe marriages. Dr Price obſerves, that the annual average of weddings among the miniſters and profeſſors in Scotland for the laſt 27 years has been 31; and the average of married perſons for 17 years ending in 1767, had been 667. This number, divided by 31, gives 21½, the expectation of marriage among them; which, he ſays, is above 2½ years more than the expectation of marriage would be, by Dr Halley's table, on the ſuppoſition, that all firſt, ſecond, and third marriages, may be juſtly conſidered as commencing one with another ſo early as the age of 30; and he has proved, that the expectation of two equal joint lives is to the expectation of a ſingle life of the ſame age as 2 to 3: conſequently, the expectation of a ſingle life at 30, among the miniſters in Scotland, cannot be leſs than 32.25. If we ſuppoſe the mean ages of all who marry annually to be 33 and 25, the expectation of every marriage would be 19 years; or one with another they would be all extinct in 19 years: the marriages which continue beyond this term, though fewer in number, enjoying among them juſt as much more duration as thoſe that fall ſhort of it enjoy leſs. But it appears from the obſervations and tables of Mr Muret, that, in the diſtrict of Vaud (dividing half the number of married perſons, viz. 38,328, by the annual medium of weddings, viz. 808), the expectation of marriage is only 23½ years: ſo much higher are the probabilities of life in the country than in towns, or than they ought to be, according to De Moivre's hypotheſis.

MARRIAGE (*Maritagium*), in *Law*, ſignifies not only the lawful joining of man and wife, but alſo the right of beſtowing a ward or a widow in marriage, as well as the land given in marriage.

Diſſolution of MARRIAGE. See DIVORCE.

Forcible MARRIAGE. See FORCIBLE *Marriage*.

Frank MARRIAGE. See FRANK.

Jactitation of MARRIAGE, in *Law*, is one of the firſt and principal matrimonial cauſes, when one of the parties boaſts or gives out, that he or ſhe is married to the other, whereby a common reputation of their matrimony may enſue. On this ground the party injured may libel the other in the ſpiritual court; and unleſs the defendant undertakes and makes out a proof of the actual marriage, he or ſhe is enjoined perpetual ſilence on that head; which is the only remedy the eccleſiaſtical courts can give for this injury.

MARRIAGE *Settlement* is a legal act, previous to marriage, whereby a jointure is ſecured to the wife after the death of the huſband. Theſe ſettlements ſeem to have been in uſe among the ancient Germans, and their kindred nation the Gauls. Of the former Tacitus gives us this account: *Dotem non uxor marito, ſed uxori maritus affert: intersunt parentes et propinqui, et munera probant* (De Mor. Germ. c. 18.). And Cæſar, (De Bell. Gallic. lib. vi. c. 18.) has given us the terms of a marriage ſettlement among the Gauls, as nicely calculated as any modern jointure: *Viri, quantas pecunias ab uxoribus dotis nomine acceperunt, tantas ex ſuis bonis, æſtimatione facta, cum dotibus communicant. Hujus omnis pecuniæ conjunctim ratio habetur, fructuſque ſervantur. Uter eorum vita ſuperarit, ad eum pars utriuſque cum fructibus ſuperiorum temporum pervenit.* The dauphin's commentator ſuppoſes that this cuſtom was the ground of the new regulations made by Juſtinian, Nov. 97. with regard to the proviſion for widows among the Romans; but ſurely there is as much reaſon to ſuppoſe, ſays Judge Blackſtone, that it gave the hint for our ſtatutable jointures. Comment. vol. ii. p. 138.

See an excellent marriage ſettlement by Blackſtone in the appendix to the ſecond volume of his Commentaries.

Duty of MARRIAGE, is a term uſed in ſome ancient cuſtoms, ſignifying an obligation on women to marry. To underſtand this, it muſt be obſerved, that old maids and widows about ſixty, who held fees in body, or were charged with any perſonal or military ſervices, were anciently obliged to marry, to render thoſe ſervices to the lord by their huſbands, or to indemnify the lord for what they could not do in perſon. And this was called *duty* or *ſervice of marriage*.

Policy of encouraging MARRIAGE. Dr Halley obſerves, that the growth and increaſe of mankind is not ſo much ſtinted by any thing in the nature of the ſpecies, as it is from the cautious difficulty moſt people make to adventure on the ſtate of marriage, from the proſpect of the trouble and charge of providing for a family; nor are the poorer ſort of people herein to be blamed, who, beſides themſelves and families, are obliged to work for the proprietors of the lands that feed them; and of ſuch does the greater part of mankind conſiſt. Were it not for the backwardneſs to marriage, there might be four times as many births as we find; for by computation from the table given under the article MORTALITY, there are 15,000 perſons above 16 and under 45, of which at leaſt 7000 are women capable of bearing children; yet there are only 1238, or little more than a ſixth part of theſe, that breed yearly: whereas, were they all married, it is highly probable that four of ſix ſhould bring forth a child every year, the political conſequences of which are evident. Therefore, as the ſtrength and glory of a kingdom or ſtate conſiſts in the multitude of ſubjects, celibacy above all things ought to be diſcouraged, as by extraordinary taxing or military ſervice; and, on the contrary, thoſe who have numerous families ſhould be allowed certain privileges and immunities, like the *jus trium liberorum* among the Romans: and eſpecially, by effectually providing for the ſubſiſtence of the poor.

MARROW, in *Anatomy*, a ſoft oleaginous ſubſtance contained in the cavity of the bones. See ANATOMY, N° 5.

MARRUBIUM, WHITE HOREHOUND: a genus of plants belonging to the didynamia claſs; and in the natural method ranking under the 42d order, *Verticillatæ*. See BOTANY *Index*.

MARS, in *Aſtronomy*, one of the eleven planets, ſituated without the earth's orbit, and remarkable for the extent of its atmoſphere and the redneſs of its light. See ASTRONOMY *Index*.

The red colour of this planet, according to Mr Brewſter*, is owing to the ſame cauſe which produces the red colour of the morning and evening clouds. When a beam of white light paſſes through any medium, its colour [illegible] becomes red, in proportion to the ſpace through which it has travelled, and the denſity of the medium. The momentum of the red or leaſt refrangible rays being greater than that of the violet or moſt refrangible rays, the former will make their way through the reſiſting medium, while the latter are either reflected or abſorbed. The colour of the beam, therefore, when it reaches the eye, muſt partake of the colour of the leaſt refrangible ray; and the redneſs of this colour muſt increaſe with the number of the violet rays that have been obſtructed. Hence we ſee,, that the ſun, moon, and ſtars appear red when in the horizon; and that every luminous object ſeen through a miſt is of a ruddy hue. Now, the planet Mars is allowed to have an atmoſphere of great denſity and extent, as is manifeſt from the dim appearance of the fixed ſtars that are placed at a conſiderable diſtance from his diſk. The ſun's light therefore, by which this planet is ſeen in itſelf having to paſs twice through the atmoſphere of Mars before it reaches the earth, muſt be deprived of a great proportion of the violet rays; and conſequently the colour of the remaining light by which Mars is viſible, muſt be red.—As there is a conſiderable difference of colour among the other planets, and likewiſe among the fixed ſtars, are we not entitled to conclude, that thoſe in which the red colour predominates, have the greateſt or the denſeſt atmoſpheres? According to this principle, Saturn muſt have the next greateſt atmoſphere to that of Mars.

Mars, in Pagan worſhip, the god of war. He was, according to ſome, the ſon of Jupiter and Juno; while others ſay that he was the ſon of Juno alone, who being diſpleaſed at Jupiter's having produced Minerva from his brain, without female aid, in revenge conceived without the aſſiſtance of the other ſex, by touching a flower ſhown to her by Flora in the plains of Olenus, and became the mother of this formidable deity. The amours of Mars and Venus, and the manner in which Vulcan caught and expoſed them to the laughter of the other gods, have been deſcribed by ſeveral of the ancient poets. He is repreſented as having ſeveral wives and miſtreſſes, and a conſiderable number of children. He was held in the higheſt veneration by the Romans, both from his being the father of Romulus their founder, and from their inclination to conqueſt; and had magnificent temples erected to him at Rome.

Mars is uſually repreſented in a chariot, drawn by furious horſes. He is completely armed; and extends his ſpear with the one hand, and graſps a ſword, imbrued in blood, with the other. He has a fierce and ſavage aſpect. Diſcord is repreſented preceding his car; and Clamour, Fear, and Terror, appear in his train. The victims ſacrificed to him were the wolf, the horſe, the woodpecker, the vulture, and the cock.

Mars, among the older chemiſts, denotes *iron*; that metal being ſuppoſed to be under the influence of the planet Mars.

MARSAIS, Cesar Chesneau du, an eminent literary character, was born at Marſeilles 1676. He attached himſelf at an early period of life to the order of the congregation of the oratory; but the ſituation was too narrow for his genius, and he ſoon left it. At Paris he married, became advocate, and entered on this new profeſſion with great ſucceſs and expectation. Diſappointed, however, in his expectations of making a ſpeedy fortune, he abandoned the law alſo. About this time the peeviſh humour of his wife occaſioned a ſeparation. We next find him as governor to the ſon of the preſident de Maiſons; and when the premature death of the father deprived him of the fruits of his induſtry, he engaged with the famous Law in the ſame capacity. After the fall of this extraordinary projector, he completed the education of the marquis de Beaufremont's children, and reared pupils worthy of his genius and induſtry. Although he was accuſed of a tendency to Deiſm, and though there was good reaſon for the accuſation; yet he never infuſed into the minds of his ſcholars any principle inconſiſtent with ſound morality, or with the Chriſtian religion. When he left M. de Beaufremont's family, he took a boarding houſe, in which, after a method of his own, he educated a certain number of young men. Unexpected circumſtances obliged him to abandon this uſeful undertaking. He was even conſtrained to give ſome occaſional leſſons for the bare neceſſaries of life. Without fortune, without hope, and almoſt without reſource, he was reduced to extreme indigence. In this ſituation he was found by the authors of the *Encyclopédie*, and made a partner in conducting that great work. Among many other excellent pieces, the article *Grammar* breathes the ſpirit of ſound philoſophy. His principles are clear and ſolid. He diſcovers an extreme knowledge of the ſubject, great accuracy in the rules, and great propriety in the application. M. le Comte de Lauraguais was ſo much affected with the diſtreſſes, and ſo much convinced of the merit of *Du Marſais*, that he procured him a penſion of 1000 livres. Du Marſais died at Paris on the 11th of June 1756, in his eightieth year, after having received the ſacrament. The compliment which he paid to the prieſt on this occaſion has been conſidered by ſome as rather equivocal. But there is no neceſſity to deprive religion of this triumph, or philoſophy of that honour which conviction and penitence muſt confer on it. "The faith of a great genius (ſays Bayle, who is entitled to credit on this ſubject), is not totally extinguiſhed: It is like a ſpark under the aſhes. Reflection and the proſpect of danger call forth its exertions. There are certain ſituations in which philoſophers are as full of anxiety and remorſe as other men." Whatever were the laſt ſentiments of Du Marſais, it cannot be denied that in the vigour of health he furniſhed ſeveral examples of irreligion, and to theſe have been added many abſurd ſtories. The ſuperiority of Du Marſais's talents conſiſted in exactneſs and perſpicuity. His ignorance of the world, and of the cuſtoms of mankind, together with the greateſt latitude in expreſſing whatever he thought, gave him that frank and unguarded ſimplicity which is often the chief ingredient of genuine humour. Fontenelle uſed to ſay of him, "that he was the moſt witty ſimpleton, and as a man of wit the moſt ſimple he ever knew." He was the Fontaine of philoſophers. In conſequence of this character, he was a nice judge of what was natural in every production, and a great enemy to all kind of affectation. His principal works are, 1. *Expoſition de la doctrine de l'Egliſe Gallicane par rapport aux prétentions de la Cour de Rome*, 12mo. This accurate work was begun at the deſire of the preſident [illegible] de M. [illegible], and did not appear till after the death of the author. 2. *Expoſition d'une methode raiſonnée pour apprendre la langue Latine*, 12mo, 1722, rare. This method appears conformable to the natural unfolding of the powers of the mind, and on that account renders the acquiſition of the language leſs difficult; but it was liable to two great objections to vulgar and unenlightened underſtandings, namely, its novelty, and the cenſure which it conveyed againſt the former method. 3. *Traité des tropes*, 1730, 8vo; again printed in 1771, 12mo. This work is intended to explain the different ſignifications of the ſame word. It is a maſterpiece of logic, of accuracy, of perſpicuity, and preciſion. The obſervations and the rules are illuſtrated by ſtriking examples calculated to ſhow both the uſe and the abuſe of the rhetorical figures. It is wonderful at the ſame time that this excellent book had very little ſale, and is ſcarcely known. A gentleman who wanted to compliment the author on this extraordinary performance, told him that he had heard a great deal of his *Hiſtoire des Tropes*, and begged to know in what particular part of the world the nation flouriſhed. 4. *Les veritables Principes de la Grammaire raiſonnée pour apprendre la langue Latine*, 1729, 4to. There was only the preface of this work publiſhed, in which he introduced the greateſt part of his *methode raiſonée*. 5. *L'abrégé de la fable du Pere Jouvenci*, arranged after the manner of the original plan, 1731, 12mo. 6. *Une reponſe manuſcrite à la Critique de l'Hiſtoire des Oracles par le Pere Baltus*. There are only imperfect fragments of theſe papers to be found. 7. *Logique, ou reflexions ſur les operations de l'Eſprit*. This is a ſhort tract, which nevertheleſs contains every thing neceſſary to be known on the art of reaſoning. It was reprinted at Paris in two parts, together with the articles which he had furniſhed for the *Encyclopédie*, 1762.

MARSAL, a town of France, in Lorrain, remarkable for its ſalt works; ſeated in a marſh on the river Selle, of difficult acceſs, which, together with the fortifications, render it an important place. E. Long. 6. 43. N. Lat. 48. 46.

MARSALA, an ancient and ſtrong town of Sicily, in the valley of Mazara. It is well peopled, and built on the ruins of the ancient Lilybœum. E. Long. 12. 27. N. Lat. 37. 52.

MARSAN, or MOUNT MARSAN, a town of France, in Gaſcony, and capital of a ſmall territory of the ſame name, fertile in wine; ſeated on the river Miduſe, in W. Long. 0. 39. N. Lat. 44. 0.

MARSAQUIVER, or MARSALQUIVER, a ſtrong and ancient town of Africa, on the coaſt of Barbary, and in the province of Beni Arax, in the kingdom of Tremeſen, with one of the beſt harbours in Africa. It was taken by the Spaniards in 1732. It is ſeated on a rock near a bay of the ſea, in W. Long. 0. 10. N. Lat. 35. 40.

MARSEILLES, a ſtrong ſea port, and the richeſt town of Provence, in France. Here is a good harbour, where the French galleys are ſtationed; for it will not admit large men of war. The entrance of the harbour, which is extremely narrow and ſurrounded by lofty mountains, protects and ſhelters veſſels during the moſt violent ſtorms. The port itſelf forms a delightful walk even in the middle of winter, as it is open to the ſouthern ſun, and crowded with vaſt numbers of people, not only of all the European nations, but of Turks, Greeks, and natives of the coaſt of Barbary. The whole ſcene is one of the moſt agreeable that can be imagined, if the chains of the galley ſlaves heard among the hum of buſineſs did not tincture it with the hateful idea of ſlavery. The galleys themſelves, uſeleſs and neglected, rot peaceably in their reſpective ſtations: and it is ſaid that no others will ever be conſtructed to ſupply their place, as they have long ceaſed to be of any utility to the ſtate, and are ſcarcely even navigable in ſevere weather. Marſeilles pretends to the moſt remote antiquity; a colony of Phocians, in ages unknown, having given it birth. It is divided into the Old Town and the New; which are ſeparated by a ſtreet, bordered with trees on each ſide. The Old Town is one of the worſt built of any in Europe. The New has ſprung up ſince the commencement of the 18th century, and has all that regularity, elegance, and convenience, which diſtinguiſh the preſent times. It is ſaid to contain 100,000 inhabitants, and is one of the moſt trading towns in France. Without the walls is the caſtle of Notre-Dame, which is very well fortified. It is a biſhop's ſee, and there is a French academy; it having been noted at all times for men of learning. In 1660, Louis XIV. built the citadel and Fort St John to keep the inhabitants in awe, becauſe they pretended to be free. The Jeſuits had a very fine obſervatory here; and in the arſenal, built not long ago, there are arms for 40,000 men. In the Houſe of Diſcipline they weave gold, ſilver, and ſilk brocades. The drugs are brought thither from all parts of the world. It is ſeated on the north ſhore of the Mediterranean, in E. Long. 4. 27. N. Lat. 43. 18. The ſurrounding country is rocky and barren, but covered for ſeveral miles on all ſides with villas and ſummer houſes, which commerce has erected.

MARSH, NARCISSUS, a learned Iriſh prelate, was born at Hannington in Wiltſhire in 1638. He was made principal of St Alban's hall, Oxford, in 1673, but removed to the provoſtſhip of Dublin college in 1678, promoted to the biſhopric of Leighlin and Ferns in 1682, tranſlated to the archbiſhopric of Caſhel in 1690, to Dublin in 1694, and to Armagh in 1703. While he held the ſee of Dublin, he built a noble library for the uſe of the public, filled it with choice books, and ſettled a proviſion for two librarians. He repaired, at his own expence, ſeveral decayed churches, beſides buying in and reſtoring many impropriations, and preſenting a great number of oriental MSS. to the Bodleian library. He was a very learned and accompliſhed man; was well verſed in ſacred and profane literature, in mathematics, natural philoſophy, the learned languages, eſpecially the oriental, and in both the theory and practice of muſic. He publiſhed, 1. *Inſtitutiones logicæ*. 2. *Manuductio ad logicam*, written by Philip de Trieu; to which he added the Greek text of Ariſtotle and ſome tables and ſchemes. 3. An introductory eſſay on the doctrine of ſounds, &c. He died in 1713.

MARSH, ſignifies a piece of ground flowed with water, yet ſo that the graſs and other vegetables riſe above the ſurface of the water, and, by their decaying, give riſe to putrid effluvia, which are very pernicious to the human body.

MARSHAL, or MARESCHAL, (*mareſcallus*), primarily [illegible] an officer who has the care of the command of horſes. N[illegible] derives the word from [illegible] "[illegible] of the horſe." [illegible] Paris from [illegible]. In the old Gallic language, *march* [illegible] "a horſe;" whence *marechal* might ſignify "a man who commanded the cavalry." Other derivations have been given by different authors; and the term itſelf has been applied to officers of very different employments.

Marſhal of France, the higheſt dignity of preferment in the French armies under the old government. The dignity of marſhal came to be for life, though at its firſt inſtitution it was otherwiſe. They were then only the king's firſt ecuyers under the conſtable; but in time they became the conſtable's lieutenants in the command of the army, the conſtable himſelf being then become captain general. At firſt they were but two in number; and their allowance was but 500 livres per annum in time of war, and nothing in time of peace; but in the reign of Francis I. a third was added; Henry II. created a fourth. Since, it has been various; Louis XIV. increaſed it to 20. Their office at firſt was, to marſhal the army under the conſtable, and to command in his abſence. They did then what the *marſhals de camp* do now; to which laſt they have given their title, and the leaſt conſiderable part of their authority.

Earl MARSHAL *of Scotland*. His office was to command the cavalry, whereas the CONSTABLE commanded the whole army. They ſeem, however, to have had a ſort of joint command, as of old all orders were addreſſed "to our conſtable and mariſchal." The office of earl mariſchal has never been out of the noble family of Keith. It was reſerved at the Union; and when the heritable juriſdictions were bought, it was in the crown, being forfeited by the rebellion of Geo. Keith, earl mariſchal, in 1715.

Earl MARSHAL *of England* is the eighth great officer of ſtate. This office, until it was made hereditary, always paſſed by grant from the king, and never was held by tenure or ſerjeantry (by any ſubject), as the offices of lord high ſteward and lord high conſtable were ſometimes held. The title is perſonal, the office honorary and officiary. They were formerly ſtyled *lord marſhal* only, until King Richard II. June 20. 1397, granted letters patent to Thomas Mowbray, earl of Nottingham, and to the heirs male of his body lawfully begotten, by the name and ſtyle of *earl marſhal*; and farther, gave them power to bear in their hand a gold truncheon, enamelled with black at each end; having at the upper end of it the king's arms engraven thereon, and at the lower end his own arms.

King James I. was pleaſed, by letters patent, dated Auguſt 29th 1622, to conſtitute Thomas Howard, earl of Arundel and Surrey, earl marſhal for life; and the next year, the ſame king granted (with the advice of the privy council, letters-patent, wherein it was declared, that during the vacancy of the office of lord high conſtable of England, the earl marſhal had the like juriſdiction in the court of chivalry, as both conſtable and marſhal jointly ever exerciſed. See CHIVALRY, *Court of*.

On the 19th of October 1672, King Charles II. was pleaſed to grant to Henry Lord Howard, and the heirs male of his body lawfully begotten, the office and dignity of earl marſhal of England, with power to execute the ſame by deputy or deputies, in as full and ample a manner as the ſame was heretofore executed by Henry Howard, Lord Maltravers, late earl of Arundel, Surrey, and Norfolk, grandfather to the ſaid Henry Lord Howard; or by Thomas Howard late duke of Norfolk, grandfather to the ſaid Thomas Howard, late earl of Arundel, Surrey, and Norfolk; or by Thomas Howard duke of Norfolk, grandfather of the ſaid Thomas Howard duke of Norfolk; or by John Mowbray duke of Norfolk, or any other earl marſhal of England; with a penſion of 20l. each year, payable out of the hanaper office in chancery; and on default of the iſſue-male of the ſaid Henry Lord Howard, with limitation to the heirs male lawfully begotten of the body of the ſaid Thomas Howard earl of Arundel, &c.; and, on the default of ſuch iſſue, to deſcend in like manner to the heirs male of Thomas late earl of Suffolk; and, on default of his iſſue male, to the heirs male of Lord William Howard, late of Naworth in the county of Cumberland, youngeſt ſon to Henry Howard late duke of Norfolk; and, on default of his iſſue male, to Charles Howard earl of Nottingham, and the heirs male of his body lawfully begotten.

*Field-*MARSHAL, an officer of high rank in the European armies. It is now, however, diſuſed in the Britiſh army; Lord Tyrawley was the laſt, appointed in 1763.

*Knight-*MARSHAL, or MARSHAL *of the King's Houſe*, an Engliſh officer, whoſe buſineſs, according to Fleta, is to execute the commands and decrees of the lord ſteward, and to have the cuſtody of priſoners committed by the court of verge. Under him are ſix marſhal's men, who are properly the king's bailiffs, and arreſt in the verge of the court, when a warrant is backed by the board of green-cloth. The court where cauſes of this kind, between man and man, are tried, is called the *Marſhalſea*, and is under the knight-marſhal. See MARSHALSEA.

This is alſo the name of the priſon in Southwark; the reaſon of which may probably be, that the marſhal of the king's houſe was wont to ſit there in judgement, or keep his priſon.

MARSHAL *of the King's Bench*, an officer who has cuſtody of the priſon called the *King's Bench* in Southwark. He gives attendance upon the court, and takes into his cuſtody all priſoners committed by the court; he is finable for his abſence, and non-attendance incurs a forfeiture of his office. The power of appointing the marſhal of the king's bench is in the crown.

In Fleta, mention is alſo made of a *marſhal of the exchequer*, to whom the court commits the cuſtody of the king's debtors, &c.

MARSHALLING *a* COAT, in *Heraldry*, is the diſpoſal of ſeveral coats of arms belonging to diſtinct families in one and the ſame eſcutcheon or ſhield, together with their ornaments, parts, and appurtenances. See HERALDRY, chap. vi. p. 466.

MARSHALSEA, *the Court of*, and the *Palace Court* at Weſtminſter, though two diſtinct courts, are frequently confounded together. The former was originally holden before the ſteward and marſhal of the king's houſe, and was inſtituted to adminiſter juſtice between the king's domeſtic ſervants, that they might not be drawn into other courts, and thereby the king loſe their ſervice. It was formerly held in, though not a part of, the *aula regis*; and, when that was ſubdivided, remained a diſtinct juriſdiction: holding plea of all treſpaſſes committed within the verge of the court, where only one of the parties is in the king's domeſtic ſervice (in which caſe the inqueſt ſhall be taken by a jury of the country); and of all debts, contracts, and covenants, where both of the contracting parties belong to the royal houſehold; and then the inqueſt ſhall be compoſed of men of the houſehold only. By the ſtatute of 13 Rich. II. ſtat. 1. c. 3. (in affirmance of the common law), the verge of the court in this reſpect extends for 12 miles round the king's place of reſidence. And, as this tribunal was never ſubject to the juriſdiction of the chief juſticiary, no writ of error lay from it (though a court of record) to the king's bench, but only to parliament, till the ſtatutes of 5 Edw. III. c. 2. and 10 Edw. III. ſtat. 2. c. 3. which allowed ſuch writ of error before the king in his place. But this court being ambulatory, and obliged to follow the king in all his progreſſes, ſo that by the removal of the houſehold actions were frequently diſcontinued, and doubts having ariſen as to the extent of its juriſdiction, King Charles I. in the ſixth year of his reign, by his letters patent, erected a new court of record, called the *curia palatii*, or *palace court*, to be held before the ſteward of the houſehold and knight-marſhal, and the ſteward of the court, or his deputy; with juriſdiction to hold plea of all manner of perſonal actions whatſoever, which ſhall ariſe between any parties within 12 miles of his majeſty's palace at Whitehall. The court is now held once a week, together with the ancient court of marſhalſea, in the borough of Southwark: and a writ of error lies from thence to the court of king's bench. But if the cauſe is of any conſiderable conſequence, it is uſually removed on its firſt commencement, together with the cuſtody of the defendant, either into the king's bench or common pleas, by a writ of *habeas corpus cum cauſa*: and the inferior buſineſs of the court hath of late years been much reduced, by the new courts of conſcience erected in the environs of London; in conſideration of which the four counſel belonging to theſe courts had ſalaries granted them for their lives by the ſtat. 23 Geo. II. c. 27.

MARSHFIELD, a town of Glouceſterſhire, ſeven miles from Bath, 12 from Chipping-Sodbury, 12½ from Briſtol, 35 from Glouceſter, and 104 from London, on the road to Briſtol, and on the very borders of Wilts. It is a conſiderable clothing-town, drives a a good trade in malt, and is famous for cakes. It conſiſts chiefly of one ſtreet of old buildings near a mile long; and is governed by a bailiff. It has a large church, with a well endowed alms houſe and a chapel to it for eight poor people, and a charity ſchool; and it has a weekly market and two fairs.

MARSHLAND, a marſhy peninſula in the county of Norfolk, oppoſite to King's Lynn, almoſt ſurrounded with the Ouſe and other navigable rivers, and an arm of the ſea. It ſeems formerly to have been recovered out of the ocean, from whoſe inundations it could never be altogether defended; and in Sir Henry Spelman's time it ſuffered two general ones, viz. one from the ſalt water, the other from the freſhes; by the laſt of which the inhabitants ſuffered 42,000l. damage. It contains about 30,000 acres, which turn to more profit by grazing than ploughing. It is about 10 miles in the wideſt place, and has no leſs than 111 brick bridges. The commonage of it belongs to ſeven villages that ſurround it. The air is ſo unhealthy, that an ague is commonly called *the Marſhland bailiff*.

MARSHMALLOW. See ALTHEA, BOTANY *Index*.

MARSI, a nation of Germany, who afterwards came to ſettle in Italy, where they occupied the territory in the environs of the Fucine lake. They at firſt proved very inimical to Rome, but in proceſs of time they became its firmeſt ſupporters. They were allowed by the Romans to be the moſt intrepid ſoldiers of their legions when in friendſhip, and the moſt formidable of their enemies when at variance; and it was a common ſaying, that Rome could neither triumph over the Marſi nor without them. They are particularly celebrated for the civil war in which they were engaged, and which from them has received the name of the *Marſian war*. The large contributions they made to ſupport the intereſt of Rome, and the number of men which they continually ſupplied to the republic, rendered them bold and aſpiring; and they claimed, with the reſt of the Italian ſtates, a ſhare of the honour and privileges which were enjoyed by the citizens of Rome. This petition, though ſupported by the intereſt, the eloquence, and the integrity of the tribune Druſus, was received with contempt by the Roman ſenate; upon which, in the 662d year of Rome, the Marſi put themſelves at the head of the Social war, one of the moſt obſtinate and dangerous oppoſitions ever made to the progreſs of the Roman power. They obtained ſeveral victories: but they were at laſt defeated; though the war was not terminated but by a grant of thoſe privileges for which they contended.

MARSICO Nuovo, a ſmall, rich, and handſome town of Italy, in the kingdom of Naples, and in the Hither Principato, with a biſhop's ſee. It is ſeated at the foot of the Apennines, near the river Agri, in E. Long. 15. 49. N. Lat. 20. 42.

MARSIGLI, LEWIS FERDINAND, COUNT, an Italian, famous for letters as well as arms, was deſcended from an ancient and noble family, and born at Bologna in 1658. He acquired a great knowledge in the art of war and fortification; ſerved under the emperor Leopold II. againſt the Turks, by whom he was taken priſoner in 1683, but redeemed, after a year's captivity. In the Spaniſh ſucceſſion war, Marſigli, then advanced to the rank of marſhal, being in the fortreſs of Briſac, which ſurrendered to the duke of Burgundy in 1703, when the place was deemed capable of holding out much longer, was ſtripped of all his commiſſions, and had his ſword broke over him; and the count d'Arco who commanded was beheaded. Marſigli now ſought for conſolation in the ſciences; as, amidſt all the hurry and tumult of war, he had made all the advantages the moſt philoſophic man could do, who had travelled purely in queſt of knowledge. He had a rich collection of every thing proper to the advancement of natural knowledge, inſtruments aſtronomical and chemical, plans of fortifications, models of

Marſton
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Mart.

machines, &c. all which he preſented to the ſenate of Bologna by an authentic act in 1712, forming at the ſame time out of them what he called *the Inſtitute of the arts and ſciences at Bologna.* He alſo founded a printing houſe, and furniſhed it with the beſt types for Latin, Greek, Hebrew, and Arabic, which he preſented in 1728 to the Dominicans at Bologna, on condition of their printing all the writings of the *Inſtitute* at prime coſt: this was called *the printing houſe of St Thomas Aquinas.* His writings on philoſophical ſubjects are numerous and valuable, in Latin, Italian, and French. He died in 1730.

MARSTON, John, an Engliſh dramatic writer, who lived in the time of James I. Wood ſays he was a ſtudent in Corpus Chriſti college, Oxford; but neither his family nor the time of his birth is known. He produced eight plays for the ſtage, which were all acted at Blackfriars with applauſe: and one of them, called the *Dutch Courtezan*, was once revived ſince the Reſtoration, under the title of the *Revenge*, or a *Match in Newgate.* There is no account when he died; but we find his works were publiſhed after his death by Shakeſpeare, and may thence reaſonably conclude that it happened about the year 1614. He was a chaſte and pure writer; avoiding all that obſcenity, ribaldry, and ſcurrility, which too many of the playwrights of that time, and indeed much more ſo in ſome periods ſince, have made the baſis of their wit, to the great diſgrace and ſcandal of the ſtage.

MARSYAS, in fabulous hiſtory, a celebrated muſician of Celenæ in Phrygia, ſon of Olympus, or of Hyagnis, or Œagrus. He was ſo ſkilful in playing on the flute, that he is generally deemed the inventor of it. According to the opinion of ſome, he found it when Minerva had thrown it aſide on account of the diſtortion of her face when ſhe played upon it. Marſyas was enamoured of Cybele, and he travelled with her as far as Nyſa, where he had the imprudence to challenge Apollo to a trial of his ſkill as a muſician. The god accepted the challenge, and it was mutually agreed that he who was defeated ſhould be flead alive by the conqueror. The Muſes, or (according to Diodorus) the inhabitants of Nyſa, were appointed umpires. Each exerted his utmoſt ſkill, and the victory, with much difficulty, was adjudged to Apollo. The god upon this tied his antagoniſt to a tree, and flead him alive: (See Apollo). The death of Marſyas was univerſally lamented; the Fauns, Satyrs, and Dryads, wept at his fate; and from their abundant tears aroſe a river of Phrygia, well known by the name of *Marſyas.* The unfortunate Marſyas is often repreſented on monuments, as tied with his hands behind his back to a tree, while Apollo ſtands before him with his lyre in his hands. In independent cities, among the ancients, the ſtatue of Marſyas was generally erected in the forum, to repreſent the intimacy which ſubſiſted between Bacchus and Marſyas as the emblems of liberty. At Celenæ, the ſkin of Marſyas was ſhown to travellers for ſome time. It was ſuſpended in the public place, in the form of a bladder or a foot ball.

The ſources of the Marſyas were near thoſe of the Meander, and theſe two rivers had their confluence a little below the town of Celenæ.

MART, a great fair held every year for buying and ſelling goods. Public marts, or places of buying and ſelling, ſuch as markets and fairs, with the tolls thereunto belonging, can only be ſet up by virtue of the king's grant, or by long and immemorial uſage and preſcription, which preſuppoſes ſuch a grant. The limitation of theſe public reſorts, to ſuch time and place as may be moſt convenient for the neighbourhood, forms a part of economics, or domeſtic polity; which, conſidering the kingdom as a large family, and the king as the maſter of it, he has clearly a right to diſpoſe and order as he pleaſes.

Martha
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Martial Law.

MARTABAN, a province of Aſia, in the kingdom of Pegu, lying in the gulf of Bengal. It is a country that produces rice and all kinds of fruits proper to the climate. It has mines of ſeveral ſorts of metals, and carries on a great trade. The chief town, which is of the ſame name, is rich, handſome, and very populous, with a good harbour. E. Long. 97. 50. N. Lat. 15. 35.

MARTEAU, the name given by French naturaliſts to a peculiar ſpecies of oyſters, called alſo *malleus* by others, the figure of which is that of a hammer, or rather of a pickaxe. See Ostrea, Conchology *Index.*

MARTHA, St, a province of South America, on the coaſt of Terra Firma, bounded on the north by the North ſea, on the eaſt by Rio de la Hache, on the ſouth by New Granada, and on the weſt by Carthagena. It is 300 miles in length and 200 in breadth, is a mountainous country, and the land very high. Here begins the famous ridge of mountains called the *Cordilleras des los Andes*, which run from north to ſouth the whole length of the continent of South America. It is extremely hot on the ſea coaſt; but cold in the internal parts, on account of the mountains. It abounds with the fruits proper to the climate; and there are mines of gold and precious ſtones, as alſo ſalt works. The Spaniards poſſeſs but one part of this province, in which they have built St Martha the capital. The air about the town is wholeſome; and is ſeated near the ſea, having a harbour ſurrounded with high mountains. It was formerly very conſiderable when the galleons were ſent thither, but is now come almoſt to nothing. W. Long. 74. 11. N. Lat. 11. 20.

Martha, *St*, or *Sierra Nevada*, a very high mountain in New Spain. Some ſay it is 100 miles in circumference at the bottom, and five miles in height. The top is always covered with ſnow in the hotteſt weather; and the French affirm, that they can perceive it from the iſland of St Domingo, which is 370 miles diſtant. W. Long. 74. 35. N. Lat. 8. 0.

Martha's Vineyard, an iſland of North America near the coaſt of New England, 80 miles ſouth of Boſton. The inhabitants apply themſelves chiefly to their fiſheries, in which they have great ſucceſs. W. Long. 70. 35. N. Lat. 41. 0.

MARTIAL, is ſometimes uſed to expreſs preparations of iron, or ſuch as are impregnated therewith; as the martial regulus of antimony, &c.

Martial Court. See *Court Martial.*

Martial Law, is the law of war that depends upon the juſt but arbitrary will and pleaſure of the king, or his lieutenant: for though the king doth not make any laws but by common conſent in parliament, yet, in time of war, by reaſon of the neceſſity of it to guard againſt dangers that often ariſe, he uſeth abſolute power, ſo that his word is a law. *Smith de Repub. Ang.* lib. ii. c. 4.

But the martial law (according to Chief Juſtice Hale), is in reality not a law, but ſomething indulged rather than allowed as a law; and it relates only to members of the army, being never intended to be executed on others, who ought to be ordered and governed by the laws to which they are ſubject, though it be a time of war. And the exerciſe of martial law, whereby any perſon might loſe his life, or member, or liberty, may not be permitted in time of peace, when the king's courts are open for all perſons to receive juſtice.

MARTIALIS, Marcus Valerius, a famous Latin poet, born at Bilbilis, now called *Bubiera*, in the kingdom of Arragon in Spain, was of the order of knights. He went to Rome at the age of 21, and ſtaid there 35 years, under the reign of Galba and the ſucceeding emperors, till that of Trajan; and having acquired the eſteem of Titus and Domitian, he was created tribune. At length, finding that he was neglected by Trajan, he returned to his own country Bilbilis, where he married a wife, and had the happineſs to live with her ſeveral years. He admires and commends her much, telling her that ſhe alone was ſufficient to ſupply the want of every thing he enjoyed at Rome. "*Romam tu mihi ſola facis*," ſays he, in the 21ſt epigram of the 12th book. She appears likewiſe to have been a lady of a very large fortune; for, in the 31ſt epigram of the ſame book, he extols the magnificence of the houſe and gardens he had received from her, and ſays that ſhe had made him a little kind of monarch."

Munera ſunt domino: poſt ſeptima luſtra reverſo,
Has Marcella domos, parvaque regna dedit.

There are ſtill extant 14 books of his epigrams, filled with points, a play upon words, and obſcenities. The ſtyle is affected. However, ſome of his epigrams are excellent; many of them are of the middling kind; but the greateſt part of them are bad: ſo that Martial never ſpoke a greater truth, than when he ſaid of his own works,

Sunt bona, ſunt quædam mediocra, ſunt mala plura.

There is alſo attributed to him a book on the ſpectacles of the amphitheatre; but the moſt learned critics think that this laſt work was not written by Martial. The beſt editions of Martial are, that *in Uſum Delphini*, 4to, Paris, 1617, and that *cum Notis Variorum*.

MARTIGUES, a ſea-port town of France, in Provence, with the title of a principality; ſeated near a lake 12 miles long and five broad, which is navigable throughout, and from whence they get excellent ſalt. E. Long. 4. 20. N. Lat. 43. 38.

MARTIN, St, was born at Sabaria in Pannonia, (at preſent *Stain* in Lower Hungary), in the beginning of the fourth century. His father was a military tribune; and he himſelf was obliged to carry arms, although peace and ſolitude were much more agreeable to his inclination. He was remarkable for every virtue, in a profeſſion which is generally conſidered to give a ſanction to vice. He divided his coat with a naked wretch whom he met at the gate of Amiens; and it is reported, that Jeſus Chriſt appeared to him on the night following, clothed in this half of his coat. Martin was then a catechumen; but he ſoon afterwards received baptiſm, and renounced the military profeſſion for the eccleſiaſtical. After paſſing many years in ſolitude, St Hilary biſhop of Poictiers gave him the power to caſt out devils. On his return to Pannonia, he perſuaded his mother to embrace Chriſtianity; and with great zeal and activity oppoſed the Arians, who governed the church in Illyria. When he was publicly whipt for giving teſtimony to the divinity of Chriſt, he bore the puniſhment with the conſtancy and patience of the firſt martyrs. This illuſtrious champion for Chriſtianity, when he heard that St Hilary was returned from baniſhment, went and ſettled in the neighbourhood of Poictiers. In this retirement, a great number of monks placed themſelves under his direction. His virtues became every day more ſplendid and remarkable, till he was drawn from his ſolitude, and with the general approbation of the clergy and people elected biſhop of Tours in the year 374. To the zeal and charity of a biſhop, he joined the humility and poverty of an anchorite. That he might detach himſelf more from the world, he built the celebrated monaſtery of Marmoutier, which ſtill remains, and which is believed to be the oldeſt abbey in France. It is ſituated near the city of Tours, betwixt the Loire and a ſteep rock. In this ſituation, together with 80 monks, St Martin diſplayed the moſt exemplary ſanctity and mortification; nor were there any monks better diſciplined than thoſe of Marmoutier. After he had converted his dioceſe to the Chriſtian faith, he became the apoſtle of all Gaul. He diffuſed the doctrines of Chriſtianity among the heathens, deſtroyed their temples, and (according to the writers of his life), confirmed the truth by an infinite number of miracles. The emperor Valentinian, at that time in Gaul, received him with every mark of reſpect and honour. The tyrant Maximus, who had revolted againſt the emperor Gratian, and ſeized on Spain, England, and Gaul, received him in a manner no leſs diſtinguiſhed. The holy biſhop attended him at Treves in the year 383, to ſolicit ſome favours. Maximus made him ſit at his table with the moſt illuſtrious perſons of his court, and placed him at his right hand. In drinking, the uſurper commanded his ſervants to give him a cup, that he might again receive it from him; but this extraordinary prelate gave it to the prieſt who accompanied him on his journey. This holy boldneſs, far from diſpleaſing them, gained him the favour of the emperor and of his court. Martin, who was an enemy to hereſy, but a friend of mankind, employed his influence with this prince to preſerve the Priſcillianiſts, who were proſecuted by Ithace and by Idace, biſhops of Spain. The biſhop of Tours would hold no communion with men whoſe principles of religion inclined them to ſhed the blood of mankind; and he obtained the life of thoſe whoſe death they had ſolicited. On his return to Tours, he prepared himſelf for the reward of his labours in another world. He died at Candes the 8th of November 397, but according to others on the 11th of November 400. His name is given to a particular opinion concerning the myſtery of the holy Trinity. St Martin is the firſt of the ſaints confeſſors to whom the Latin church offered public prayers. His life is written in elegant Latin by Fortunatus, and Sulpicius Severus one of his diſciples. Paul of Perigueux and Fortunatus of Poictiers have given us Sulpicius's life of Martin in verſe; but they have debaſed the admirable proſe of the author by a wretched poetical imitation. Nicolas Gervais wrote alſo the life of St Martin, full of many curious and entertaining facts, publiſhed at Tours in 1699, in 4to. The tradition at Amiens is, that St Martin performed the act of charity which rendered him ſo famous, near an ancient gate of the city, of which the ruins are ſtill viſible. The following Latin verſes, which do more honour to the ſaint than to the poet, are inſcribed on one of the ſtones:

Hic quondam veſtem Martinus dimidiavit;
Ut faceremus idem, nobis exemplificavit.

Martin, *Benjamin*, one of the moſt eminent artiſts and mathematicians of the age, was born in 1704. After publiſhing a variety of ingenious treatiſes, and particularly a Scientific Magazine under his own name, and carrying on for many years a very extenſive trade as an optician and globe maker in Fleet-ſtreet, the growing infirmities of age compelled him to withdraw from the active part of buſineſs. Truſting too fatally to what he thought the integrity of others, he unfortunately, though with a capital more than ſufficient to pay all his debts, became a bankrupt. The unhappy old man, in a moment of deſperation from this unexpected ſtroke, attempted to deſtroy himſelf; and the wound, though not immediately mortal, haſtened his death, which happened February 9th 1782, in his 78th year. He had a valuable collection of foſſils and curioſities of almoſt every ſpecies; which, after his death, were almoſt given away by public auction. His principal publications, as far as they have occurred to recollection, are, The Philoſophic Grammar; being a view of the preſent ſtate of experimental phyſiology, or natural philoſophy, 1735, 8vo. A new, complete, and univerſal Syſtem or Body of Decimal Arithmetic, 1735, 8vo. The young Students Memorial Book, or Patent Library, 1735, 8vo. Deſcription and Uſe of both the Globes, the Armillary Sphere and Orrery, Trigonometry, 1736, 2 vols 8vo. Memoirs of the Academy of Paris, 1740, 5 vols. Syſtem of the Newtonian Philoſophy, 1759, 3 vols. New Elements of Optics, 1759. Mathematical Inſtitutions, viz. Arithmetic, Algebra, Geometry, and Fluxions, 1759. Natural Hiſtory of England, with a Map of each County, 1759, 2 vols. Philology, and Philoſophical Geography, 1759. Mathematical Inſtitutions, 1764, 2 vols. Lives of Philoſophers, their Inventions, &c. 1764. Introduction to the Newtonian Philoſophy, 1765. Inſtitutions of Aſtronomical Calculations, 2 parts, 1765. Deſcription and Uſe of the Air Pump, 1766. Deſcription of the Torricellian Barometer, 1766. Appendix to the Deſcription and Uſe of the Globes, 1766. Philoſophia Britannica, 1778, 3 vols. Gentleman and Lady's Philoſophy, 3 vols. Miſcellaneous Correſpondence, 4 vols. Syſtem of Philology. Philoſophical Geography. Magazine [illegible], 14 vols. Principles of Pump-work. Theory of the Hydrometer. Doctrine of Logarithms.

Martin, *St*, a ſmall but ſtrong town of France in the iſle of Rhée, with a harbour and a ſtrong citadel, fortified after the manner of Vauban. The iſland lies near the coaſt of Poitou. W. Long. 1. 0. N. Lat. 45. 40.

Cape Martin, a promontory of Valencia in Spain, near a town called *Denia*, and ſeparates the gulf of Valencia from that of Alicant.

Martin, *St*, an iſland of America, and one of the Caribbees, lying on the gulf of Mexico, to the north-weſt of St Bartholomew, and to the ſouth-weſt of Anguilla. It is 42 miles in circumference; has neither harbour nor river, but ſeveral ſalt pits. After various revolutions, it is at length in poſſeſſion of the French and Dutch, who poſſeſs it conjointly. W. Long. 62. 35. N. Lat. 18. 15.

Martin. See Hirundo, Ornithology *Index*, and Muſtela, Mammalia *Index*.

Free Martin, in *Zoology*, is a name given in this country to a cow calf caſt at the ſame time with a bull calf, which is a kind of hermaphrodite that is never known to breed nor to diſcover the leaſt inclination for the bull, nor does the bull ever take the leaſt notice of it. See Hermaphrodite.

MARTINGALE, in the manege, a thong of leather, faſtened to one end of the girths under a horſe's belly, and at the other end to the muſs-roll, to keep him from rearing.

MARTINICO, the chief of the French Caribbee iſlands, the middle of which is ſituated in W. Long. 61. 0. N. Lat. 14. 30.

This iſland was firſt ſettled by M. Deſnambuc a Frenchman, in the year 1635, with only 100 men from St Chriſtopher's. He choſe rather to have it peopled from thence than from Europe; as he foreſaw, that men, tired with the fatigue of ſuch a long voyage, would moſtly periſh ſoon after their arrival, either from the climate, or from the hardſhips incident to moſt emigrations. They completed their firſt ſettlement without any difficulty. The natives, intimidated by their fire-arms, or ſeduced by promiſes, gave up the weſtern and ſouthern parts of the iſland to the new comers. In a ſhort time, however, perceiving the number of theſe enterpriſing ſtrangers daily increaſing, they reſolved to extirpate them, and therefore called in the ſavages of the neighbouring iſlands to aſſiſt them. They fell jointly upon a little fort that had been haſtily erected; but were repulſed, with the loſs of 700 or 800 of their beſt warriors, who were left dead on the ſpot.

After this check, the ſavages for a long time diſappeared entirely; but at laſt they returned, bringing with them preſents to the French, and making excuſes for what had happened. They were received in a friendly manner, and the reconciliation ſealed with pots of brandy. This peaceable ſtate of affairs, however, was of no long continuance; the French took ſuch undue advantages of their ſuperiority over the ſavages, that they ſoon rekindled in the others that hatred which had never been entirely ſubdued. The ſavages, whoſe manner of life requires a vaſt extent of land, finding themſelves daily more and more ſtraitened, had recourſe to ſtratagem, in order to deſtroy their enemies. They feparated into fmall bands, and way-laid the French as they came fingly out into the woods to hunt, and, waiting till the fportfman had difcharged his piece, rufhed upon and killed him before he could charge it again. Twenty men had been thus affaffinated before any reafon could be given for their fudden difappearance: but as foon as the matter was known, the French took a fevere and fatal revenge; the favages were purfued and maffacred, with their wives and children, and the few that efcaped were driven out of Martinico, to which they never returned.

The French being thus left fole mafters of the ifland, lived quietly on thofe fpots which beft fuited their inclinations. At this time they were divided into two claffes. The firft confifted of thofe who had paid their paffage to the ifland, and thefe were called *inhabitants*; and to thefe the government diftributed lands, which became their own, upon paying a yearly tribute. Thefe inhabitants had under their command a multitude of diforderly people brought over from Europe at their expence, whom they called *engagés*, or bondmen. This engagement was a kind of flavery for the term of three years: on the expiration of which they were at liberty, and became the equals of thofe whom they had ferved. They all confined themfelves at firft to the culture of tobacco and cotton; to which was foon added that of arnotto and indigo. The culture of fugar alfo was begun about the year 1650. Ten years after, one Benjamin d'Acofta, a Jew, planted fome cocoa trees; but his example was not followed till 1684, when chocolate was more commonly ufed in France. Cocoa then became the principal fupport of the colonifts, who had not a fufficient fund to undertake fugar plantations; but by the inclemency of the feafon in 1718, all the cocoa trees were deftroyed at once.—Coffee was then propofed as a proper object of culture. The French miniftry had received, as a prefent from the Dutch, two of thefe trees, which were carefully preferved in the king's botanical garden. Two young fhoots were taken from thefe, put on board a fhip for Martinico, and intrufted to the care of one Mr Defclieux. The fhip happened to be ftraitened for want of frefh water: and the trees would have perifhed, had not that gentleman fhared with them that quantity of water which was allowed for his own drinking. The culture of coffee was then begun, and attended with the greateft and moft rapid fuccefs. About the end of laft century, however, the colony had made but fmall advances. In 1700, it had only 6597 white inhabitants. The favages, mulattoes, and free negroes, men, women, and children, amounted to no more than 507. The number of flaves was but 14,566. All thefe together made a population of 21,645 perfons. The whole of the cattle amounted to 2668 horfes or mules, and 9217 head of horned cattle. The ifland produced a great quantity of cocoa, tobacco, and cotton; had nine indigo houfes, and 183 fmall fugar plantations.

After the peace of Utrecht, Martinico began to emerge from that feeble ftate in which it had fo long continued. The ifland then became the mart for all the windward French fettlements. In the ports of it the neighbouring iflands fold their produce, and bought the commodities of the mother country; and, in fhort, Martinico became famous all over Europe. In 1736, there were on the ifland 447 fugar works; 11,953,232 coffee trees, 103,870 of cocoa; 2,068,480 plants of cotton, 39,400 of tobacco, 6750 of arnotto. The fupplies for provifions confifted of 4,806,142 banana trees, 34,483,000 trenches of caffava; and 247 plots of potatoes and yams. The number of blacks amounted to 72,000 men, women, and children. Their labour had improved the plantations as far as was confiftent with the confumption then made in Europe of American productions; and the annual exports from the ifland amounted to about 700,000l.

Martinico.

The connexions of Martinico with the other iflands entitled her to the profits of commiffion, and the changes of tranfport; as fhe alone was in the poffeffion of carriages. This profit might be rated at the tenth of the produce; and the fum total muft have amounted to near 765,000l. This ftanding debt was feldom called in, and left for the improvement of their plantations. It was increafed by advances in money, flaves, and other neceffary articles; fo that Martinico became daily more and more a creditor to the other iflands, and thus kept them in conftant dependence; while they all enriched themfelves by her affiftance.

The connexions of this ifland with Cape Breton, Canada, and Louifiana, procured a market for the ordinary fugars, the inferior coffee, the molaffes, and rum, which would not fell in France. In exchange the inhabitants received falt fifh, dried vegetables, deals, and fome flour. In the clandeftine trade on the coafts of Spanifh America, confifting wholly of goods manufactured by the nation, the commodity made a profit of 90 per cent. on the value of about 175,000l. fent yearly to the caraccas, or neighbouring colonies.

So many profperous engagements brought immenfe fums into Martinico. Upwards of 787,000l. were conftantly circulated in that ifland with great rapidity: and this is perhaps the only country in the world where the fpecie has been fo confiderable as to make it a matter of indifference to them whether they dealt in gold, filver, or commodities. This extenfive trade brought into the ports of Martinico annually 200 fhips from France; 14 or 15 fitted out by the mother country for the coaft of Guinea, 60 from Canada, 10 or 12 from the iflands of Margaretta and Trinidad; befides the Englifh and Dutch fhips that came to carry on a fmuggling trade. The private navigation from the ifland to the northern colonies, to the Spanifh continent, and to the windward iflands, employed 120 veffels from 20 to 30 tons burden.

The war of 1744 put a ftop to this profperity. Not that the fault was in Martinico itfelf; its navy, conftantly exercifed, and accuftomed to frequent engagements, which the carrying on a contraband trade required, was prepared for action. In lefs than fix months, 40 privateers, fitted out at St Peter's, fpread themfelves about the latitude of the Caribbee iflands. They fignalized themfelves in a manner worthy of the ancient freebooters; returning conftantly in triumph, and laden with an immenfe booty. Yet, in the midft of thefe fucceffes, an entire ftop was put to the navigation of the colony, both to the Spanifh coaft and to Canada; and they were conftantly difturbed even on their own coafts. The few fhips that came from

France, in order to compenſate the hazards they were expoſed to by the loſs of their commodities, ſold them at a very advanced price, and bought them at a very low one. By this means the produce declined in value, the lands were ill cultivated, the works neglected, and the ſlaves periſhing for want.

When every thing thus ſeemed tending to decay, the peace at laſt reſtored the freedom of trade, and with it the hopes of recovering the ancient proſperity of the iſland. The event, however, did not anſwer the pains that were taken to attain it. Two years had not elapſed after the ceſſation of hoſtilities, when the colony loſt the contraband trade ſhe carried on with the American Spaniards. This was owing to the ſubſtitution of regiſter ſhips to the fleets; and thus were the attempts of the ſmugglers confined within very narrow bounds. In the new ſyſtem, the number of ſhips was undetermined, and the time of their arrival uncertain: which occaſioned a variation in the price of commodities unknown before; and from that time the ſmuggler, who only engaged in this trade from the certainty of a fixed and conſtant profit, would no longer purſue it, when it did not ſecure him an equivalent to the riſks he ran. But this loſs was not ſo ſenſibly felt by the colony, as the hardſhips brought upon them by the mother country. An unſkilful adminiſtration clogged the reciprocal and neceſſary connexion between the iſlands and North America with ſo many formalities, that in 1755 Martinico ſent but four veſſels to Canada. The direction of the colonies, now committed to the care of ignorant and avaricious clerks, ſoon loſt its importance, ſunk into contempt, and was proſtituted to venality. The debts which had been contracted, during a ſeries of calamities, had not yet been paid off, when the war broke out afreſh. After a ſeries of misfortunes and defeats, the iſland fell into the hands of the Britiſh. It was reſtored, however, in July 1763, 16 months after it had been conquered; but deprived of all the neceſſary means of proſperity, that had made it of ſo much importance. For ſome years paſt, the contraband trade carried on to the Spaniſh coaſts was almoſt entirely loſt. The ceſſion of Canada had precluded all hopes of opening again a communication, which had only been interrupted by temporary miſtakes. The productions of the Grenades, St Vincent, and Dominica, which were now become Britiſh dominions, could no longer be brought into their harbours; and a new regulation of the mother country, which forbade her having any intercourſe with Guadaloupe, left her no hopes from that quarter.

The colony, thus deprived of every thing as it were, and deſtitute, nevertheleſs contained, at the laſt ſurvey, which was taken on the 1ſt of January 1770, in the compaſs of 28 pariſhes, 12,450 white people of all ages and of both ſexes; 1814 free blacks or mulattoes; 70,553 ſlaves, and 443 fugitive negroes. The number of births in 1766, was in the proportion of one in 32 among the white people, and of one in 25 among the blacks. From this obſervation, if it were conſtant, it ſhould ſeem that the climate of America is much more favourable to the propagation of the Africans than of the Europeans: ſince the former multiply ſtill more in the labours and hardſhips of ſlavery, than the latter in the midſt of plenty and freedom. The conſequence muſt be, that in proceſs of time the increaſe of blacks in America will ſurpaſs that of the white men; and, perhaps, at laſt avenge this race of victims on the deſcendants of their oppreſſors.

The cattle of the colony conſiſts of 8283 horſes or mules; 12,376 head of horned cattle; 975 hogs; and 13,544 ſheep or goats.

Their proviſions are 17,030,596 trenches of caſſava; 3,000,048 banana trees, and 406 ſquares and a half of yams and potatoes.

Their plantations contain 11,444 ſquares of land, planted with ſugar; 6,638,757 coffee trees; 871,043 cocoa trees; 1,764,807 cotton plants; 59,966 trees of caſſia, and 61 of arnotto.

The meadows or ſavannahs take up 10,072 ſquares of land: there are 11,966 in wood, and 5448 uncultivated or forſaken.

The plantations which produce coffee, cotton, cocoa, and other things of leſs importance, are 1515 in number. There are but 286 for ſugar. They employ 116 water-mills, 12 wind-mills, and 184 turned by oxen. Before the hurricane of the 13th of Auguſt 1766, there were 302 ſmall habitations and 15 ſugar-works more.

In 1770, France imported from Martinico, upon 202 trading veſſels, 177,116 quintals of fine ſugar, and 12,579 quintals of raw ſugar; 68,518 quintals of coffee; 11,731 quintals of cocoa; 6048 quintals of cotton; 2518 quintals of caſſia; 783 caſks of rum; 307 hogſheads of molaſſes; 150 pounds of indigo; 2147 pounds of preſerved fruits; 47 pounds of chocolate; 282 pounds of raſped tobacco; 492 pounds of rope-yarn; 334 cheſts of liqueurs; 224 hogſheads of molaſſes, &c. 451 quintals of wood for dyeing; and 12,108 hides in the hair. All theſe productions together have been bought in the colony itſelf, for 536,631l. 9s. 10d. It is true, that the colony has received from the mother country to the amount of 588,412l. 16s. 6d. of merchandiſe; but part of this has been ſent away to the Spaniſh coaſts, and another part has been conveyed to the Engliſh ſettlements.

The iſland is 16 leagues in length and 45 in circumference, leaving out the capes, ſome of which extend two or three leagues into the ſea. It is very uneven, and interſected in all parts by a number of hillocks; which are moſtly of a conical form. Three mountains riſe above theſe ſmaller eminences. The higheſt bears the indelible marks of a volcano. The woods with which it is covered continually attract the clouds, which occaſions noxious damps, and contributes to make it horrid and inacceſſible; while the two others are in moſt parts cultivated. From theſe mountains iſſue the many ſprings that water the iſland. Theſe waters, which flow in gentle ſtreams, are changed into torrents on the ſlighteſt ſtorm. Their qualities are derived from the ſoil over which they flow. In ſome places they are excellent; in others ſo bad, that the inhabitants are obliged to drink the water they have collected during the rainy ſeaſon.

Of all the French ſettlements in the Weſt Indies, Martinico is the moſt happily ſituated with regard to the winds which prevail in thoſe ſeas. Its harbours poſſeſs the ineſtimable advantage of affording a certain ſhelter from the hurricanes which annoy theſe latitudes. The harbour of Fort Royal is one of the beſt in all the

Martinico || Martyr.

the windward islands; and so celebrated for its safety, that, when it was open to the Dutch, their ship-masters had orders from the republic to take shelter there in June, July, and August, the three months in which the hurricanes are most frequent. The lands of the Lamentin, which are but a league diſtant, are the richeſt and moſt fertile in the whole iſland. The numerous ſtreams which water this fruitful country, convey loaded canoes to a conſiderable diſtance from the ſea. The protection of the fortifications ſecured the peaceable enjoyment of ſo many advantages; which, however, were balanced by a ſwampy and unwholeſome ſoil. This capital of Martinico was alſo the rendezvous of the men of war; which branch of the navy has always oppreſſed the merchantmen. On this account, Fort Royal was an improper place to become the centre of trade, which was therefore removed to St Peter's. This little town, notwithſtanding the fires that have four times reduced it to aſhes, ſtill contains 1700 houſes. It is ſituated on the weſtern coaſt of the iſland, on a bay, or inlet, which is almoſt circular. One part of it is built on the ſtrand along the ſea ſide, which is called the *anchorage;* and is the place deſtined for ſhips and warehouſes. The other part of the town ſtands upon a low hill; it is called the *Fort*, from a ſmall fortification that was built there in 1665, to check the ſeditions of the inhabitants againſt the tyranny of monopoly; but it now ſerves to protect the road from foreign enemies. Theſe two parts of the town are ſeparated by a rivulet.

The anchorage is at the back of a pretty high and ſteep hill. Shut up as it were by this hill, which intercepts the eaſterly winds, the moſt conſtant and moſt ſalubrious in theſe parts; expoſed, without any refreſhing breezes, to the ſcorching beams of the ſun, reflected from the hill, from the ſea, and the black ſand on the beach; this place is extremely hot, and always unwholeſome. Beſides, there is no harbour; and the ſhips which cannot winter ſafely upon this coaſt are obliged to take ſhelter at Fort Royal. But theſe diſadvantages are compenſated by the conveniency of the road of St Peter's, for loading and unloading of goods; and by its ſituation, which is ſuch that ſhips can freely go in and out at all times, and with all winds.

Martinico again fell into the hands of the Britiſh in 1794; but was reſtored to France by the treaty of peace in 1801.

MARTLETS, in *Heraldry*, little birds repreſented without feet; and uſed as a difference or mark of diſtinction for younger brothers, to put them in mind that they are to truſt to the wings of virtue and merit, in order to raiſe themſelves, and not to their feet, they having little land to ſet their foot on. See HERALDRY.

MARTYNIA, a genus of plants belonging to the didynamia claſs; and in the natural method ranking under the 40th order, *Perſonatæ*. See BOTANY *Index*.

MARTYR, is one who lays down his life, or ſuffers death, for the ſake of his religion. The word is Greek, μαρτυς, and properly ſignifies "a witneſs." It is applied, by way of eminence, to thoſe who ſuffer in witneſs of the truth of the goſpel.

The Chriſtian church has abounded in martyrs, and hiſtory is filled with ſurpriſing accounts of their ſingular conſtancy and fortitude under the cruelleſt torments human nature was capable of ſuffering. The primitive Chriſtians were accuſed by their enemies of paying a ſort of divine worſhip to the martyrs. Of this we have an inſtance in the anſwer of the church of Smyrna to the ſuggeſtion of the Jews, who, at the martyrdom of Polycarp, deſired the heathen judge not to ſuffer the Chriſtians to carry off his body, leſt they ſhould leave their crucified maſter, and worſhip him in his ſtead. To which they anſwered, "We can neither forſake Chriſt, nor worſhip any other: for we worſhip him as the Son of God; but love the martyrs as the diſciples and followers of the Lord, for the great affection they have ſhown to their King and Maſter." A like anſwer was given at the martyrdom of Fructuoſus in Spain. For when the judge aſked Eulogius, his deacon, Whether he would not worſhip Fructuoſus? as thinking, that, though he refuſed to worſhip the heathen idols, he might yet be inclined to worſhip a Chriſtian martyr: Eulogius replied, "I do not worſhip Fructuoſus, but him whom Fructuoſus worſhips." The primitive Chriſtians believed, that the martyrs enjoyed very ſingular privileges; that upon their death they were immediately admitted to the beatific viſion, while other ſouls waited for the completion of their happineſs till the day of judgement; and that God would grant chiefly to their prayers the haſtening of his kingdom, and ſhortening the times of perſecution.

The churches built over the graves of the martyrs, and called by their names, in order to preſerve the memory of their ſufferings, were diſtinguiſhed by the title *martyrium confeſſio*, or *memoria*.

The feſtivals of the martyrs are of very ancient date in the Chriſtian church, and may be carried back at leaſt till the time of Polycarp, who ſuffered martyrdom about the year of Chriſt 168. On theſe days the Chriſtians met at the graves of the martyrs, and offered prayers and thankſgivings to God for the examples they had afforded them: they celebrated the euchariſt, and gave alms to the poor; which, together with a panegyrical oration or ſermon, and reading the acts of the martyrs, were the ſpiritual exerciſes of theſe anniverſaries.

Of the ſayings, ſufferings, and deaths of the martyrs, though preſerved with great care for the above purpoſe, and to ſerve as models to future ages, we have but very little left, the greateſt part of them having been deſtroyed during that dreadful perſecution which Diocleſian carried on for ten years with freſh fury againſt the Chriſtians; for a moſt diligent ſearch was then made after all their books and papers; and all of them that were found were committed to the flames. Euſebius, indeed, compoſed a martyrology, but it never reached down to us; and thoſe ſince compiled are extremely ſuſpected. From the eighth century downwards, ſeveral Greek and Latin writers endeavoured to make up the loſs, by compiling, with vaſt labour, accounts of the lives and actions of the ancient martyrs, but which conſiſt of little elſe than a ſeries of fables: Nor are thoſe records that paſs under the name of Martyrology worthy of ſuperior credit, ſince they bear the moſt evident marks both of ignorance and falſehood.

MARTYR, *Peter*, a famous divine, born at Florence in 1500. He ſtudied philoſophy and the languages at Padua and Bononia, was a regular Auguſtine in the monaſtery of Fieſoli, and was conſtituted one of the

Martyrology, Marvell.

he preached in Italy. Zuinglius and Bucer's writings gave him a good opinion of the Proteſtants, and his converſation with Valdes confirmed it. He preached that doctrine at Rome in private; but, being impeached, went to Naples, and thence to Lucca, where he brought over to the Proteſtant intereſt Emanuel Tremellius, Celſus, Martinengas, Paul Lacicius, and Jeremiah Zanchy. He was ſent for to England by King Edward VI. and made profeſſor of divinity at Oxford in 1549. In Queen Mary's reign he returned to Straſburg, and was preſent at the conference of Poiſſy. His ſentiments were not the ſame with Calvin's about Chriſt's preſence in the euchariſt. He wrote a great number of works, and died in 1562.

MARTYROLOGY, a catalogue or liſt of martyrs, including the hiſtory of their lives and ſufferings for the ſake of religion. The term comes from *μαρτυς* "*witneſs*," and *λογος* "*diſcourſe*."

The martyrologies draw their materials from the kalendars of particular churches, in which the ſeveral feſtivals dedicated to them are marked; and which ſeem to be derived from the practice of the ancient Romans, who inſerted the names of heroes and great men in their faſti or public regiſters.

The martyrologies are very numerous, and contain many ridiculous and even contradictory narratives: which is eaſily accounted for, if we conſider how many forged and ſpurious accounts of the lives of ſaints and martyrs appeared in the firſt ages of the church, which the legendary writers afterwards adopted without examining into the truth of them. However, ſome good critics, of late years, have gone a great way towards clearing the lives of the ſaints and martyrs from the monſtrous heap of fiction they laboured under. See the article LEGEND.

The Martyrology of Euſebius of Cæſarea was the moſt celebrated in the ancient church. It was tranſlated into Latin by St Jerome; but the learned agree that it is not now extant. That attributed to Beda, in the eighth century, is of very doubtful authority; the names of ſeveral ſaints being there found who did not live till after the time of Beda. The ninth century was very fertile in martyrologies; then appeared that of Florus, ſubdeacon of the church at Lyons; who, however, only filled up the chaſms in Beda. This was publiſhed about the year 830, and was followed by that of Wandelbertus, monk of the dioceſe of Treves, written in verſe about the year 844, and this by that of Uſuard, a French monk, and written by the command of Charles the Bald in 875, which laſt is the martyrology now ordinarily uſed in the Romiſh church. That of Rabanus Maurus is an improvement on Beda and Florus, written about the year 845; that of Notker, monk of St Gal, was written about the year 894. The martyrology of Ado, monk of Ferrieres, in the dioceſe of Treves, afterwards archbiſhop of Vienne, is a deſcendant of the Roman, if we may ſo call it; for Du Sollier gives its genealogy thus: The martyrology of St Jerome is the great Roman martyrology; from this was made the little Roman one printed by Roſweyd; of this little Roman martyrology was formed that of Beda, augmented by Florus. Ado compiled his in the year 858. The martyrology of Nevelon, monk of Corbie, written about the year 1089, is little more than an abridgement of that of Ado; Father Kircher alſo makes mention of a Coptic martyrology preſerved by the Maronites at Rome.

We have alſo ſeveral proteſtant martyrologies, containing the ſufferings of the reformed under the papiſts, viz. an Engliſh martyrology, by J. Fox; with others by Clark. Bray, &c.

MARTYROLOGY is alſo uſed, in the Romiſh church, for a roll or regiſter kept in the veſtry of each church, containing the *names* of all the ſaints and martyrs, both of the univerſal church and of the particular ones of that city or monaſtery.

MARTYROLOGY is alſo applied to the painted or written catalogues in the Romiſh churches, containing the foundations, obits, prayers, and maſſes, to be ſaid each day.

MARVELL, ANDREW, an ingenious writer in the 17th century, was bred at Cambridge. He travelled through the moſt polite parts of Europe, and was ſecretary to the embaſſy at Conſtantinople. His firſt appearance in public buſineſs at home was as aſſiſtant to Mr John Milton, Latin ſecretary to the protector. A little before the reſtoration, he was choſen by his native town, Kingſton upon Hull, to ſit in that parliament, which began at Weſtminſter April 25th 1660; and is recorded as the laſt member of parliament who received the wages or allowance anciently paid to repreſentatives by their conſtituents. He ſeldom ſpoke in parliament, but he had great influence without doors upon the members of both houſes; and Prince Rupert had always the greateſt regard for his advice. He made himſelf very obnoxious to the government by his actions and writings; notwithſtanding which, King Charles II. took great delight in his converſation, and tried all means to win him over to his ſide, but in vain, nothing being ever able to ſhake his reſolution. There were many inſtances of his firmneſs in reſiſting the offers of the court; but he was proof againſt all temptations. The king having one night entertained him, ſent the lord treaſurer Danby the next morning to find out his lodgings; which were then up two pair of ſtairs in one of the little courts in the Strand. He was buſy writing, when the treaſurer opened the door abruptly upon him. Surpriſed at the ſight of ſo unexpected a viſitor, Mr Marvell told his Lordſhip, "That he believed he had miſtaken his way." Lord Danby replied, "Not, now I have found Mr Marvell;" telling him he came from his majeſty, to know what he could do to ſerve him. Coming to a ſerious explanation, he told the lord treaſurer, that he knew the nature of courts full well; that whoever is diſtinguiſhed by a prince's favour, is certainly expected to vote in his intereſt. The Lord Danby told him, that his majeſty had only a juſt ſenſe of his merits, in regard to which he only deſired to know if there was any place at court he could be pleaſed with. Theſe offers, though urged with the greateſt earneſtneſs, had no effect upon him. He told the lord treaſurer, that he could not accept of them with honour; for he muſt be either ungrateful to the king in voting againſt him, or falſe to his country in giving into the meaſures of the court. The only favour therefore he had to requeſt of his majeſty was, that he would eſteem him as dutiful a ſubject as any he had, and more in his proper intereſt by refuſing his offers than if he had embraced them. The Lord Danby finding no argu-

Marvel. Mary. ments could prevail, told him, that the king had ordered a thouſand pounds for him, which he hoped he would receive till he could think what farther to aſk of his majeſty. The laſt offer was rejected with the ſame ſtedfaſtneſs of mind as the firſt; though, as ſoon as the lord treaſurer was gone, he was forced to ſend to a friend to borrow a guinea. He died not without ſtrong ſuſpicions of his being poiſoned, in 1678, in the 58th year of his age. In 1688, the town of Kingſton upon Hull contributed a ſum of money to erect a monument over him in the church of St Giles in the Fields, where he was interred, and an epitaph compoſed by an able hand; but the miniſtry of that church forbade both the inſcription and monument to be placed there. He wrote many ingenious pieces; as, The Rehearſal tranſproſed; A ſhort Hiſtorical Eſſay concerning General Councils, Creeds, and Impoſitions in matters of religion, &c.; alſo Poems and Letters.

Marvel of Peru, See MIRABILIS, BOTANY *Index*.

MARY, the mother of our Saviour Jeſus Chriſt, and a virgin at the time that ſhe conceived him; daughter of Joachim and of Anna, of the tribe of Judah, and married to Joſeph of the ſame tribe. The Scripture tells us nothing of her parents, not ſo much as their names, unleſs Heli mentioned by St Luke iii. 23. be the ſame with Joachim. All that is ſaid concerning the birth of Mary and of her parents is only to be found in ſome apocryphal writings: which, however, are very ancient.

Mary was of the royal race of David, as was alſo her huſband; ‘A virgin, eſpouſed to a man whoſe name was *Joſeph*, of the houſe of David,’ ſays our tranſlation of St Luke i. 27. which tranſlation Mr Whitby thinks might be better rendered thus: A virgin of the houſe of David, eſpouſed to a man whoſe name was *Joſeph*, and the virgin's name was *Mary*; becauſe this agrees better with the words of the angel, “The Lord ſhall give him the throne of his father David,” ver. 32. For ſince the angel had plainly told the virgin, that ſhe ſhould have this ſon without the knowledge of any man, it was not Joſeph's but Mary's being of the houſe of David, that made David his father.

Mary was akin to the race of Aaron, ſince Elizabeth the wife of Zacharais was her couſin (ver. 36.) Mary very early made a vow of chaſtity, and engaged herſelf to perpetual virginity. The *Proto-evangelium* of St James tells us, that ſhe was conſecrated to the Lord, and offered in the temple from her earlieſt youth; and that the prieſts gave her Joſeph for a ſpouſe, who was a holy and venerable old man, whom Providence appointed for his purpoſe by a miracle, the rod which he commonly carried having grown green and flouriſhed as Aaron's did formerly. He eſpouſed Mary, not to live with her in the ordinary uſe of marriage, and to have children by her, but only that he might be the guardian of her virginity. Though theſe circumſtances are not to be relied on as certain, yet Mary's reſolution of continency, even in a married ſtate, cannot be called in queſtion, ſince her virginity is atteſted by the goſpel, and that herſelf ſpeaking to the angel, who declared to her that ſhe ſhould become the mother of a ſon, told him that “ſhe knew not a man,” (ver. 34.), or that ſhe lived in continence with her huſband: for which reaſon, when Joſeph perceived her pregnancy, he was extremely ſurpriſed at it, knowing the mutual reſolution they had agreed to of living in continence though in a ſtate of marriage. Mary.

When Mary was ready to lie in, an edict was publiſhed by Cæſar Auguſtus, which decreed, that all the ſubjects of the empire ſhould go to their own cities, there to have their names regiſtered according to their families. Thus Joſeph and Mary, who were both of the lineage of David, betook themſelves to the city of Bethlehem, from whence was the original of their family. But while they were in this place, the time being fulfilled in which Mary was to be delivered, ſhe brought forth her firſt-born ſon. She wrapped him in ſwaddling-clothes, and laid him in the manger of the ſtable or cavern whither they had retired: for they could find no place in the public inn, becauſe of the great concourſe of people that were then at Bethlehem on the ſame occaſion; or they were forced to withdraw into the ſtable of the inn, not being able to get a more convenient lodging, becauſe of the multitude of people then at Bethlehem.

At the ſame time the angels made it known to the ſhepherds who were in the fields near Bethlehem, and who came in the night to ſee Mary and Joſeph and the child lying in the manger, and to pay him their tribute of adoration. Mary took notice of all theſe things, and laid them up in her heart, (Luke ii. 19. Matth. ii. 8, 9. 10, 11, &c.) A few days after, the magi or wiſe men came from the eaſt, and brought to Jeſus the myſterious preſents of gold, frankincenſe, and myrrh; after which being warned by an angel that appeared to them in a dream, they returned into their own country by a way different from that by which they came. But the time of Mary's purification being come, that is forty days after the birth of Jeſus, Mary went to Jeruſalem (Luke ii. 21.), there to preſent her ſon in the temple, and there to offer the ſacrifice appointed by the law for the purification of women after childbirth. There was then at Jeruſalem an old man named *Simeon*, who was full of the Holy Ghoſt, and who had received a ſecret aſſurance that he ſhould not die before he had ſeen Chriſt the Lord. He came then into the temple by the influence of the ſpirit of God, and taking the little Jeſus within his arms, he bleſſed the Lord: and afterwards addreſſing himſelf to Mary, he told her, ‘That this child ſhould be for the riſing and falling of many in Iſrael, and for a ſign which ſhould be ſpoken againſt; even ſo far as that her own ſoul ſhould be pierced as with a ſword, that the ſecret thoughts in the hearts of many might be diſcovered.’ Afterwards when Joſeph and Mary were preparing to return to their own country of Nazareth (Matth. ii. 13, 14.), Joſeph was warned in a dream to retire into Egypt with Mary and the child, becauſe Herod had a deſign to deſtroy Jeſus. Joſeph obeys the admonition, and they continued in Egypt till after the death of Herod; upon which he and Mary returned to Nazareth, not daring to go to Bethlehem becauſe it was in the juriſdiction of Archelaus the ſon and ſucceſſor of Herod the Great. Here the holy family took up their reſidence, and remained till Jeſus began his public miniſtry. We read of Mary being preſent at the marriage of Cana in Galilee, with her ſon Jeſus and his diſciples (John ii.

1, 2

1, 2, &c.) On which occaſion Jeſus having turned water into wine, being the firſt public miracle that he performed, he went from thence to Capernaum with his mother and his brethren, or his parents and diſciples: and this ſeems to be the place where the holy virgin afterwards chiefly reſided. However, St Epiphanius thinks that ſhe followed him everywhere during the whole time of his preaching; though we do not find the evangeliſts make any mention of her among the holy women that followed him and miniſtered to his neceſſities. The Virgin Mary was at Jeruſalem at the laſt paſſover that our Saviour celebrated there; ſhe ſaw all that was tranſacted againſt him, followed him to Calvary, and ſtood at the foot of his croſs with a conſtancy worthy of the mother of God. There Jeſus ſeeing his mother and his beloved diſciple near her, he ſaid to his mother, "Woman, behold thy ſon;" and to the diſciple, "Behold thy mother." And from that hour the diſciple took her home to his own houſe. It is not to be doubted, but that our Saviour appeared to his mother immediately after his reſurrection; and that ſhe was the firſt, or at leaſt one of the firſt, to whom he vouchſafed this great conſolation. She was with the apoſtles at his aſcenſion, and continued with them at Jeruſalem, expecting the coming of the Holy Ghoſt (Acts i. 14.). After this, ſhe dwelt in the houſe of St John the Evangeliſt, who took care of her as of his own mother. It is thought that he took her along with him to Epheſus, where ſhe died in an extreme old age. There is a letter of the œcumenical council of Epheſus, importing, that in the fifth century it was believed ſhe was buried there. Yet this opinion was not ſo univerſal, but that there are authors of the ſame age who think ſhe died and was buried at Jeruſalem.

Mary, *Magdalen*, who has been generally confounded with Mary the ſiſter of Martha and Lazarus, but very improperly, was probably that ſinner mentioned by St Luke, chap. vii. 36. 37. &c. whoſe name he does not tell us. There are ſome circumſtances ſufficient to convince us, that ſhe is the ſame whom he calls *Mary Magdalen* in chap. viii. 2. and from whom he ſays Jeſus drove out ſeven devils. Jeſus having healed the widow's ſon of Nain, entered into the city, and there was invited to eat by a Phariſee named *Simon*. While he was at table, a woman of a ſcandalous life came into the houſe, having an alabaſter box full of perfumed oil, and ſtanding upright behind Jeſus, and at his feet, for he was lying at table on a couch after the manner of the ancients, ſhe poured her perfume on his feet, kiſſed them, watered them with her tears, and wiped them with her hair. The Phariſee obſerving this, ſaid within himſelf, If this man were a prophet, he would know who this woman is that touches him, that ſhe is one of a wicked life. Then Jeſus, who knew the bottom of his heart, illuſtrated her caſe by a parable; and concluded with anſwering the woman, that her ſins were forgiven her. In the following chapter, St Luke tells us, that Jeſus, in company with his apoſtles, preached the goſpel from city to city: and that there were ſeveral women whom he had delivered from evil ſpirits, and had cured of their infirmities, among whom was Mary called Magdalen, out of whom went ſeven devils. This, it muſt be owned, is no poſitive poof that the ſinner mentioned before was Mary Magdalen; however, it is all we have in ſupport of this opinion: An opinion which has been ably controverted by others. Mary Magdalen had her ſurname, it is thought, from the town of Magdalia in Galilee. Lightfoot believes that this Mary is the ſame with Mary the ſiſter of Lazarus. Magdalen is mentioned by the evangeliſts among the women that followed our Saviour, to miniſter to him according to the cuſtom of the Jews. St Luke viii. 2. and St Mark xvi. 9. obſerve, that this woman had been delivered by Jeſus Chriſt from ſeven devils. This ſome underſtand in the literal ſenſe; but others take it figuratively, for the crimes and wickedneſs of her paſt life (ſuppoſing her to be the ſinner firſt above mentioned), from which Chriſt had reſcued her. Others maintain, that ſhe had always lived in virginity; and conſequently they make her a different perſon from the ſinner mentioned by St Luke: and by the ſeven devils of which ſhe was poſſeſſed, they underſtand no other than a real poſſeſſion, which is not inconſiſtent with a holy life. This indeed is the moſt probable opinion, and that which has been beſt ſupported. In particular, the author of a "Letter to Jonas Hanway" on the ſubject of Magdalen Houſe, publiſhed in 1758, has ſhown by a variety of learned remarks, and quotations both from the Scriptures and from the beſt commentators, that Mary Magdalen was not the ſinner ſpoken of by St Luke, but on the contrary that ſhe "was a woman of diſtinction, and very eaſy in her worldly circumſtances. For a while, ſhe had laboured under ſome bodily indiſpoſition, which our Lord miraculouſly healed, and for which benefit ſhe was ever after very thankful. So far as we know, her conduct was always regular and free from cenſure; and we may reaſonably believe, that after her acquaintance with our Saviour it was edifying and exemplary. I conceive of her (continues our author) as a woman of a fine underſtanding, and known virtue and diſcretion, with a dignity of behaviour becoming her age, her wiſdom, and her high ſtation: by all which, ſhe was a credit to him whom ſhe followed as her maſter and benefactor. She ſhowed our Lord great reſpect in his life, at his death, and after it; and ſhe was one of thoſe to whom he firſt ſhowed himſelf after his reſurrection."

Mary Magdalen followed Chriſt in the laſt journey that he made from Galilee to Jeruſalem, and was at the foot of the croſs with the holy virgin (John xix. 25. Mark xv. 47.) After which ſhe returned to Jeruſalem to buy and prepare the perfumes, that ſhe might embalm him after the ſabbath was over which was then about to begin. All the ſabbath day ſhe remained in the city; and the next day early in the morning ſhe went to the ſepulchre, along with Mary the mother of James and Salome (Mark xvi. 1, 2. Luke xxiv. 1, 2.) On the way, they inquired of one another, who ſhould take away the ſtone from the mouth of the ſepulchre, and were ſenſible of a great earthquake. This was the token of our Saviour's reſurrection. Being come to his tomb, they ſaw two angels, who informed them that Jeſus was riſen. Upon this Mary Magdalen runs immediately to Jeruſalem, and acquaints the apoſtles with this good news, returning herſelf to the ſepulchre. Peter and John came alſo, and were witneſſes that the body was no longer there. They returned: but Mary ſtayed, and ſtooping forward to examine the inſide of the tomb, ſhe there ſaw two angels ſitting, one at the head and the other at foot of the tomb; and immediately afterwards, upon turning about, ſhe beheld the Lord himſelf. She would have caſt herſelf at his feet to kiſs them. But Jeſus ſaid to her, "Touch me not, for I am not yet aſcended to my Father." As if he had ſaid, "You ſhall have leiſure to ſee me hereafter; go now to my brethren, my apoſtles, and tell them I am going to aſcend to my God and to their God, to my Father and to their Father." Thus had Mary the happineſs of firſt ſeeing our Saviour after his reſurrection. (See Math. xxviii. 5. &c. Mark xvi. 6. &c. John xx. 11, 17.

She returned then to Jeruſalem and told the apoſtles that ſhe had ſeen the Lord, that ſhe had ſpoken to him, and told them what he had ſaid to her. But at firſt they did not believe her, till her report was confirmed by many other teſtimonies.—This is what the goſpel informs us concerning Mary Magdalen, different from Mary the ſiſter of Martha, though ſhe has been often called by this name. For, as to the pretended Hiſtory of Mary Magdalen, which is ſaid to have been written in Hebrew by Marcella ſervant of Martha; this can only relate to Mary ſiſter of Martha, and beſides is a mere piece of impoſture.

MARY, queen and tyrant of England, was eldeſt daughter of Henry VIII. by his firſt wife Catharine of Spain, and born at Greenwich in February 1517. Her mother was very careful of her education, and provided her with tutors to teach her what was fitting. Her firſt preceptor was the famous Linacre, who drew up for her uſe the Rudiments of Grammar, and afterwards *De emendata ſtructura Latini Sermonis libri ſex*. Linacre dying when ſhe was but ſix years old, Ludovicus Vives, a very learned man of Valenza in Spain, was her next tutor; and he compoſed for her *De ratione ſtudii puerilis*. Under the direction of theſe excellent men, ſhe became ſo great a miſtreſs of Latin, that Eraſmus commends her for her epiſtles in that language. Towards the end of her father's reign, at the earneſt ſolicitation of Queen Catharine Parr, ſhe undertook to tranſlate Eraſmus's Paraphraſe on the goſpel of St John; but being caſt into ſickneſs, as Udall relates, partly by overmuch ſtudy in this work, after ſhe had made ſome progreſs therein, ſhe left the reſt to be done by Dr Mallet her chaplain. This tranſlation is printed in the firſt volume of Eraſmus's Paraphraſe upon the New Teſtament, London, 1548, folio; and before it is a Preface, written by Udall, the famous maſter of Eton ſchool, and addreſſed to the queen dowager (A).—Had ſhe been educated in Spain, however, and an inquiſitor had been her preceptor, ſhe could not have imbibed more ſtrongly the bloody principles of Romiſh perſecution; and to the eternal diſgrace of the Engliſh prelacy, though the reformation had taken root in both univerſities, ſhe found Engliſh biſhops ready to carry her cruel deſigns to ſubvert it into effectual execution. King Edward her brother dying the 6th of July 1553, ſhe was proclaimed queen the ſame month, and crowned in October by Stephen Gardiner biſhop of Wincheſter. Upon her acceſſion to the throne, ſhe declared, in her ſpeech to the council, that ſhe would not perſecute her Proteſtant ſubjects: but in the following month, ſhe prohibited preaching without a ſpecial licenſe; and before the expiration of three months, the Proteſtant biſhops were

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(A) As this preface contains many reflections which may very much edify the females of this age, we ſhall for their ſakes here tranſcribe a part of it. Mr Udall takes occaſion in it to obſerve to her majeſty, "The great number of noble women at that time in England, not only given to the ſtudy of human ſciences and ſtrange tongues, but alſo ſo thoroughly expert in the Holy Scriptures, that they were able to compare with the beſt writers, as well in enditing and penning of godly and fruitful treatiſes, to the inſtruction and edifying of realms in the knowledge of God, as alſo in tranſlating good books out of Latin or Greek into Engliſh, for the uſe and commodity of ſuch as are rude and ignorant of the ſaid tongues. It was now (he ſaid) no news in England to ſee young damſels in noble houſes, and in the courts of princes, inſtead of cards and other inſtruments of idle trifling, to have continually in their hands either pſalms, homilies, and other devout meditations, or elſe Paul's epiſtles, or ſome book of holy ſcripture matters, and as familiarly both to read or reaſon thereof in Greek, Latin, French, or Italian, as in Engliſh. It was now a common thing to ſee young virgins ſo trained in the ſtudy of good letters, that they willingly ſet all other vain paſtimes at nought for learning's ſake. It was now no news at all to ſee queens and ladies of moſt high eſtate and progeny, inſtead of courtly dalliance, to embrace virtuous exerciſes of reading and writing, and with moſt earneſt ſtudy, both early and late, to apply themſelves to the acquiring of knowledge, as well in all other liberal arts and diſciplines, as alſo moſt eſpecially of God and his holy word. And in this behalf (ſays he), like as to your highneſs, as well as for compoſing and ſetting forth many godly pſalms, and divers other contemplative meditations, as alſo for cauſing theſe paraphraſes to be tranſlated into our vulgar tongue, England can never be able to render thanks ſufficient; ſo may it never be able, as her deſerts require, enough to praiſe and magnify the moſt noble, the moſt virtuous, the moſt witty, and the moſt ſtudious Lady Mary's grace, for taking ſuch pain and travail in tranſlating this Paraphraſe of Eraſmus upon the goſpel of St John.—What could be a more plain declaration of her moſt conſtant purpoſe to promote God's word, and the free grace of his goſpel?" &c Mr Udall was miſtaken; ſhe never meant any ſuch thing: for ſoon after her acceſſion to the throne, a proclamation was iſſued for calling in and ſuppreſſing this very book, and all others that had the leaſt tendency towards furthering the reformation. And Mr Walpole is of opinion, that the ſickneſs which came upon her while ſhe was tranſlating St John, was all affected: "For (ſays he) ſhe would not ſo eaſily have been caſt into ſickneſs had ſhe been employed on the Legends of St Tereſa or St Catharine of Sienna."

were excluded the houſe of lords, and all the ſtatutes of Edward VI. reſpecting the Proteſtant religion were repealed. In July 1554 ſhe was married to Philip prince of Spain, eldeſt ſon of the emperor Charles V.; and now began that perſecution againſt the Proteſtants for which her reign is ſo juſtly infamous. Some have ſuppoſed, that the queen was herſelf of a compaſſionate and humane diſpoſition; and that moſt of thoſe barbarities were tranſacted by her biſhops without her knowledge or privity. Without her knowledge and privity they could not be: it would be a better defence of her to ſay, that a ſtrict adherence to a falſe religion, and a conſcientious obſervance of its pernicious and cruel dictates, overruled and got the better of that goodneſs of temper which was natural to her. But neither can this plea be reaſonably admitted by any one, who conſiders her unkind and inhuman treatment of her ſiſter the Lady Elizabeth; her admitting a council for the taking up and burning of her brother's body; her moſt ungrateful and perfidious breach of promiſe with the Suffolk men; her ungenerous and barbarous treatment of Judge Hales, who had ſtrenuouſly defended her right of ſucceſſion to the crown; and of Archbiſhop Cranmer, who in reality had ſaved her life. Shall we excuſe all this by ſaying, *Tantum religio potuit ſuadere malorum?* Her obligations to Cranmer deſerve to be more particularly ſet forth. Burnet ſays, "that her firm adherence to her mother's cauſe and intereſt, and her backwardneſs in ſubmitting to the king her father, were thought crimes of ſuch a nature by his majeſty, that he came to a reſolution to put her openly to death: and that when all others were unwilling to run any riſk in ſaving her, Cranmer alone ventured upon it. In his gentle way he told the king "that ſhe was young and indiſcreet, and therefore it was no wonder if ſhe obſtinately adhered to that which her mother and all about her had been inſtilling into her for many years; but that it would appear ſtrange, if he ſhould for this cauſe ſo far forget the father, as to proceed to extremities with his own child; that if ſhe was ſeparated from her mother and her people, in a little time there might be ground gained on her; but that to take away her life, would raiſe horror through all Europe againſt him;" by which means he preſerved her. —Along with Archbiſhop Cranmer, who had thus ſaved her life, the biſhops Ridley and Latimer were alſo condemned for hereſy at Oxford, and afterwards burnt. In 1556, the perſecution became general; and Proteſtants of all ranks and ages, and of both ſexes, fell victims to papal fury. It is obſervable, likewiſe, that the ſame perfidious violation of promiſes and treaties prevailed in the queen's council, with reſpect to public affairs. By the treaty of marriage concluded between the queen and Philip, it was expreſsly ſtipulated that England ſhould not be engaged in any wars with France on account of Spain; yet in 1557, Philip who had brought immenſe ſums of money into England, procured an offenſive and defenſive alliance againſt France, from the Engliſh adminiſtration, and Some of the queen's choiceſt troops were ſent over to the aſſiſtance of the Spaniards in the Low Countries: the loſs of Calais to the French was the firſt fruit of this war: and ſome affirm, that upon this ſingle occaſion the queen ſhowed a ſtrong attachment to her native country, lamenting this ſtroke ſo deeply, that it occaſioned her death; but it is better authenticated that ſhe was carried off by an epidemic fever, which raged ſo violently that it did not leave a ſufficient number of men in health to get in the harveſt. She had long, however, been a prey, if not to remorſe, yet to diſappointment and chagrin, ariſing from various croſs accidents, ſuch as want of children, and the abſence and unkindneſs of Philip conſequent thereupon. Her death happened Nov. 7. 1558, in the 43d year of her age, after a reign of five years, four months, and eleven days. There are ſome things of her writing ſtill extant. Strype has preſerved three prayers or meditations of hers: the firſt, "Againſt the Aſſaults of Vice;" the ſecond, "A Meditation touching Adverſity;" the third, "A Prayer to be read at the Hour of Death." In Fox's "Acts and Monuments" are printed eight of her letters to King Edward and the lords of the council, on her nonconformity, and on the impriſonment of her chaplain Dr Mallet. In the *Sylloge epiſtolarum* are ſeveral more of her letters, extremely curious: one of her delicacy in never having written but to three men; one of affection for her ſiſter; one after the death of Anne Boleyn; and one very remarkable of Cromwell to her. In "Haynes's State Papers," are two in Spaniſh, to the emperor Char. V. There is alſo a French letter, printed by Strype from the Cottonian library, in anſwer to a haughty mandate from Philip, when he had a mind to marry the Lady Elizabeth to the duke of Savoy, againſt the queen's and princeſs's inclination: it is written in a moſt abject manner, and a wretched ſtyle.

Mary of Medicis, wife of Henry IV. king of France, was declared ſole regent of the kingdom in 1610, during the conſternation which the aſſaſſination of that beloved king had occaſioned. By her ambitious intrigues, the nation loſt all its influence abroad, and was torn to pieces at home by contending factions. After ſeveral viciſſitudes of fortune, ſhe was abandoned by her ſon Louis XIII. whoſe reign had been conſtantly diſturbed by the civil commotions ſhe had occaſioned; and died in indigence at Bruſſels in 1642, aged 68. She built the ſuperb palace of Luxembourg at Paris, and embelliſhed that city with aqueducts and other ornaments.

Mary queen of Scotland, daughter of James V. was born in the royal palace of Linlithgow on the 8th of December 1542. Her mother was Mary, the eldeſt daughter of Claude duke of Guiſe, and widow of Louis duke of Longueville. Her father dying a few days after her birth, ſhe ſcarcely exiſted before ſhe was hailed queen.

The government of a queen was unknown in Scotland; and the government of an infant queen could not command much reſpect from martial and turbulent nobles, who exerciſed a kind of ſovereignty over their own vaſſals; who looked upon the moſt warlike of their monarchs in hardly any other light than as the chief of the ariſtocracy; and who, upon the ſlighteſt diſguſts, were ever ready to fly into rebellion, and to carry their arms to the foot of the throne. James had not even provided againſt the diſorders of a minority, by committing to proper perſons the care of his daughter's education, and the adminiſtration of affairs in her name. The former of theſe objects, however, was not neglected, though the regency of the kingdom was intruſted to very feeble hands. At ſix years of age Mary was conveyed to France, where ſhe received her education in the court of Henry II. The opening powers of her mind, and her natural diſpoſitions, afforded early hopes of capacity and merit. After being taught to work with her needle and in tapeſtry, ſhe was inſtructed in the Latin tongue; and ſhe is ſaid to have underſtood it with an accuracy, which is in this age very uncommon in perſons of her ſex and elevated rank, but which was not then ſurpriſing, when it was the faſhion among great ladies to ſtudy the ancient languages. In the French, the Italian, and the Spaniſh tongues, her proficiency was ſtill greater, and ſhe ſpoke them with equal eaſe and propriety. She walked, danced, and rode with enchanting gracefulneſs; and ſhe was qualified by nature, as well as by art, to attain to diſtinction in painting, poetry, and muſic. To accompliſh the woman, was not, however, the ſole object of her education. Either ſhe was taught, or ſhe very early diſcovered, the neceſſity of acquiring ſuch branches of knowledge as might enable her to diſcharge with dignity and prudence the duties of a ſovereign; and much of her time was devoted to the ſtudy of hiſtory, in which ſhe delighted to the end of her life.

Whilſt Mary reſided in the court of Henry II. her perſonal charms made a deep impreſſion on the mind of the Dauphin. It was in vain that the conſtable Montmorency oppoſed their marriage with all his influence. The importance of her kingdom to France, and the power of her uncles the princes of Lorraine, were more than ſufficient to counteract his intrigues; and the Dauphin obtained the moſt beautiful princeſs in Chriſtendom.

Though this alliance placed the queen of Scotland in the moſt conſpicuous point of view, in the politeſt court of Europe, and drew to her thoſe attentions which are in the higheſt degree pleaſing to a female mind in the gaiety of youth; it may yet be conſidered as having accidentally laid the foundation of the greateſt part of her future misfortunes. Elizabeth, who now ſwayed the ſceptre of England, had been declared illegitimate by an act of parliament: and though the Engliſh Proteſtants paid no regard to a declaration which was compelled by the tyrannic violence of Henry VIII. and which he himſelf had indeed rendered null by calling his daughter to the throne after her brother and elder ſiſter; yet the papiſts both at home and abroad had objections to the legitimacy of Elizabeth's birth, founded on principles which with them had greater weight than the acts of any human legiſlature. Mary was unqueſtionably the next heir in regular ſucceſſion to the Engliſh throne, if Elizabeth ſhould die without legitimate iſſue; and upon her marriage to the Dauphin, ſhe was induced by the perſuaſion of her uncles, by the authority of the French king, and no doubt partly by her own ambition, to aſſume the title and arms of queen of England and Ireland. Theſe, indeed, ſhe forebore as ſoon as ſhe became her own miſtreſs; but the having at all aſſumed them was an offence which Elizabeth could never forgive, and which rankling in her boſom made her many years afterwards purſue the unhappy queen of Scots to the block.

Henry II. dying ſoon after the marriage of the Dauphin and Mary, they mounted the throne of France. In that elevated ſtation, the queen did not fail to diſtinguiſh herſelf. The weakneſs of her huſband ſerved to exhibit her accompliſhments to the greateſt advantage; and in a court where gallantry to the ſex, and the moſt profound reſpect for the perſon of the ſovereign, were inſeparable from the manners of a gentleman, ſhe learned the firſt leſſons of royalty. But this ſcene of ſucceſsful grandeur and unmixed felicity was of ſhort duration. Her huſband Francis died unexpectedly after a ſhort reign of ſixteen months. Regret for his death, her own humiliation, the diſgrace of her uncles the princes of Lorraine, which inſtantly followed, and the coldneſs of Catharine of Medicis the queen mother, who governed her ſon Charles IX. plunged Mary into inexpreſſible ſorrow. She was invited to return to her own kingdom, and ſhe tried to reconcile herſelf to her fate.

She was now to paſs from a ſituation of elegance and ſplendour to the very reign of incivility and turbulence, where moſt of her accompliſhments would be utterly loſt. Among the Scots of that period, elegance of taſte was little known. The generality of them were ſunk in ignorance and barbariſm; and what they termed religion, dictated to all a petulant rudeneſs of ſpeech and conduct to which the queen of France was wholly unaccuſtomed. During her minority and abſence, the proteſtant religion had gained a kind of eſtabliſhment in Scotland; obtained, indeed, by violence, and therefore liable to be overturned by an act of the ſovereign and the three eſtates in parliament. The queen, too, was unhappily of a different opinion from the great body of her ſubjects, upon that one topic, which among them actuated almoſt every heart, and directed almoſt every tongue. She had been educated in the church of Rome, and was ſtrongly attached to that ſuperſtition: Yet ſhe had either moderation enough in her ſpirit, or diſcretion enough in her underſtanding, not to attempt any innovation in the prevailing faith of Proteſtantiſm. She allowed her ſubjects the full and free exerciſe of their new religion, and only challenged the ſame indulgence for her own. She contrived to attach to her, whether from his heart or only in appearance, her natural brother, the prior of St Andrew's; a man of ſtrong and vigorous parts, who, though he had taken the uſual oath of obedience to the pope, had thrown off his ſpiritual allegiance, and placed himſelf at the head of the reformers. By his means ſhe cruſhed an early and formidable rebellion; and in reward for his ſervices conferred upon him a large eſtate, and created him earl of Murray. For two or three years her reign was proſperous, and her adminiſtration applauded by all her ſubjects except the Proteſtant preachers; and had ſhe either remained unmarried, or beſtowed her affections upon a more worthy object, it is probable that her reign would have [illegible] to proſperity among [illegible] the moſt fortunate and the moſt deſerving of Britiſh monarchs.

But a queen, young, beautiful, and accompliſhed, an ancient and hereditary kingdom, and the expectation of a mighty inheritance, were [illegible] to excite the love and ambition of the moſt illuſtrious princes. Mary, however, who kept her eye always [illegible] the Engliſh ſucceſſion, [illegible] motives, and afterwards by love the most exceſſive, ſhe gave her hand to Henry Stuart lord Darnley, the ſon of the earl of Lenox. This nobleman was, after herſelf, the neareſt heir to the crown of England; he was likewiſe the firſt in ſucceſſion after the earl of Arran to the crown of Scotland: and it is known that James V. had intended to introduce into his kingdom the Salique law, and to ſettle the crown upon Lenox in preference to his own daughter. Theſe conſiderations made Mary ſolicitous for an interview with Darnley; and at that interview love ſtole into her heart, and effaced every favourable thought of all her other ſuitors. Nature had indeed been laviſh to him of her kindneſs. He was tall of ſtature; his countenance and ſhapes were beautiful and regular; and, amidſt the maſks and dancing with which his arrival was celebrated, he ſhone with uncommon luſtre. But the bounty of nature extended not to his mind. His underſtanding was narrow; his ambition exceſſive; his obſtinacy inflexible; and under the guidance of no fixed principle, he was inconſtant and capricious. He knew neither how to enjoy his proſperity nor how to enſure it.

On the 29th of July 1565, this ill-fated pair were married; and though the queen gave her huſband every poſſible evidence of the moſt extravagant love; though ſhe infringed the principles of the conſtitution to confer upon him the title of king; and though ſhe was willing to ſhare with him all the offices, honours, and dignities of royalty—he was not ſatisfied with his lot, but ſoon began to clamour for more power. He had not been married ſeven months, when he entered into a conſpiracy to deprive Mary of the government, and to ſeat himſelf on her throne. With this view he headed a band of factious nobles, who entered her chamber at night; and though ſhe was then far advanced in her pregnancy, murdered her ſecretary in her preſence, whilſt one of the ruffians held a cocked piſtol to her breaſt. Such an outrage, together with his infidelity and frequent amours, could not fail to alienate the affections of a high ſpirited woman, and to open her eyes to thoſe defects in his character which the ardors of love had hitherto prevented her from ſeeing. She ſighed and wept over the precipitation of her marriage: but though it was no longer poſſible to love him, ſhe ſtill treated him with attention and reſpect, and laboured to faſhion him to the humour of her people.

This was labour in vain. His prepoſterous vanity and aſpiring pride rouſed the reſentment and the ſcorn of the nobles: his follies and want of dignity made him little with the people. He deſerted the conſpirators with whom he had been leagued in the aſſaſſination of the ſecretary; and he had the extreme imprudence to threaten publicly the earl of Murray, who, from his talents and his followers, poſſeſſed the greateſt power of any man in the kingdom. The conſequence was, that a combination was formed for the king's deſtruction; and, on the 10th day of February 1567, the houſe in which he then reſided was early in the morning blown up with gunpowder, and his dead and naked body, without any marks of violence, was found in an adjoining field.

Such a daring and atrocious murder filled every mind with horror and aſtoniſhment. The queen, who had been in ſome meaſure reconciled to her huſband, was overwhelmed with grief, and took every method in her power to diſcover the regicides; but for ſome days nothing appeared which could lead to the diſcovery. Papers indeed were poſted on the moſt conſpicuous places in Edinburgh, accuſing the earl of Bothwell of the crime; and rumours were induſtriouſly circulated that his horrid enterpriſe was encouraged by the queen. Conſcious, it is to be preſumed, of her own innocence, Mary was the leſs diſpoſed to believe the guilt of Bothwell, who was accuſed as having only acted as her inſtrument; but when he was charged with the murder by the earl of Lennox, ſhe inſtantly ordered him on his trial. Through the management of the earl of Morton and others, who were afterwards diſcovered to have been partners in his guilt, Bothwell was acquitted of all ſhare and knowledge of the king's murder; and what is abſolutely aſtoniſhing, and ſhows the total want of honour at that time in Scotland, this flagitious man procured, by means of the ſame treacherous friends, a paper ſigned by the majority of the nobles, recommending him as a fit huſband for the queen!

Armed with this inſtrument of miſchief, which he weakly thought ſufficient to defend him from danger, Bothwell ſoon afterwards ſeized the perſon of his ſovereign, and carried her a priſoner to his caſtle at Dunbar. It has indeed been alleged by the enemies of the queen, that no force was employed on the occaſion; that ſhe was ſeized with her own conſent: and that ſhe was even privy to the ſubſcribing of the bond by the nobles. But it has been well obſerved by one of her ableſt vindicators (A), that "her previous knowledge of the bond, and her acquieſcence in the ſeizure of her perſon, are two facts in apparent oppoſition to each other. Had the queen acted in concert with Bothwell in obtaining the bond from the nobles, nothing remained, but, under the ſanction of their unanimous addreſs, to have proceeded directly to the marriage. Inſtead of which, can we ſuppoſe her ſo weak as to reject that addreſs, and rather *chooſe* that Bothwell ſhould attempt to ſeize and carry her off by violence?—an attempt which many accidents might fruſtrate, and which at all events could not fail to render him or both of them odious to the whole nation. Common ſenſe, then, as well as candour, muſt induce us to believe, that the ſcheme of ſeizing the queen was ſolely the contrivance of Bothwell and his aſſociates, and that it was really by force that ſhe was carried to Dunbar." Being there kept a cloſe priſoner for 12 days; having, as there is reaſon to believe, actually ſuffered violence on her perſon; perceiving no appearance of a reſcue; and being ſhown the infamous bond of the nobles; Mary promiſed to receive her raviſher for a huſband, as in her opinion the only refuge for

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(A) Tytler's *Diſſertation on the Marriage of Queen Mary with the earl of Bothwell*: Tranſactions of the Society of Antiquaries of Scotland, vol. i.

Mary. for her injured honour. Without condemning with aſperity this compliance of the queen, it is impoſſible not to recollect the more dignified conduct which Richardſon attributes in ſimilar circumſtances to his Clariſſa; and every man who feels for the ſufferings, and reſpects the memory of Mary, muſt regret that ſhe had not fortitude to reſiſt every attempt to force upon her as a huſband the profligate and audacious villain who had offered her ſuch an inſult as no virtuous woman ought ever to forgive. This, however, is only to regret that ſhe was not more than human; that ſhe who poſſeſſed ſo many perfections, ſhould have had them blended with one defect. "In the irretrievable ſituation of her affairs, let the moſt ſevere of her ſex ſay what courſe was left for her to follow? Her firſt and moſt urgent concern was to regain her liberty. That probably ſhe attained by promiſing to be directed by the advice of her council, where Bothwell had nothing to fear." The marriage, thus inauſpiciouſly contracted, was ſolemnized on the 15th of May 1567; and it was the ſignal for revolt to Morton, Lethington, and many of the other nobles, by whoſe wicked and relentleſs policy it had been chiefly brought about, and who had bound themſelves to employ their ſwords againſt all perſons who ſhould preſume to diſturb ſo deſirable an event.

As Bothwell was juſtly and univerſally deteſted, and as the rebels pretended that it was only againſt him and not againſt their ſovereign that they had taken up arms, troops flocked to them from every quarter. The progreſs and iſſue of this rebellion will be ſeen in our hiſtory of SCOTLAND: ſuffice it to ſay here, that upon the faith of promiſes the moſt ſolemn, not only of perſonal ſafety to herſelf, but of receiving as much honour, ſervice, and obedience, as ever in any former period was paid by the nobility to the princes her predeceſſors, the unhappy queen delivered herſelf into the hands of her rebels, and perſuaded her huſband to fly from the danger which in her apprehenſion threatened his life. Theſe promiſes were inſtantly violated. The faithleſs nobles, after inſulting their ſovereign in the cruelleſt manner, hurried her as a priſoner to a caſtle within a lake, where ſhe was committed to the care of that very woman who was the mother of her baſtard brother; who, with the natural inſolence of a whore's meanneſs, ſays Mr Whitaker, aſſerted the legitimacy of her own child and the illegitimacy of Mary; and who actually carried the natural vulgarity of a whore's impudence ſo far, as to ſtrip her of all her royal ornaments, and to dreſs her like a mere child of fortune in a coarſe brown caſſoc.

In this diſtreſs the queen's fortitude and preſence of mind did not forſake her: She contrived to make her eſcape from her priſon, and ſoon found herſelf at the head of 6000 combatants. This army, however, was defeated; and, in oppoſition to the advice and entreaties of all her friends, ſhe haſtily formed the reſolution of taking *refuge in England*. The archbiſhop of St Andrew's in particular accompanied her to the border; and when ſhe was about to quit her own kingdom, he laid hold of her horſe's bridle, and on his knees conjured her to return: but Mary proceeded, with the utmoſt reliance on the friendſhip of Elizabeth, which had been offered to her when ſhe was a priſoner, and of the ſincerity of which ſhe harboured not a doubt.

That princeſs, however, who had not yet forgotten her aſſumption of the title and arms of queen of England, was now taught to dread her talents, and to be envious of her charms. She therefore, under various pretences, and in violation not only of public faith, but even of the common rights of hoſpitality, kept her a cloſe priſoner for 19 years: encouraged her rebellious ſubjects to accuſe her publicly of the murder of her huſband: allowed her no opportunity of vindicating her honour: and even employed venal ſcribblers to blaſt her fame. Under this unparalleled load of complicated diſtreſs, Mary preſeved the magnanimity of a queen, and practiſed with ſincerity the duties of a Chriſtian. Her ſufferings, her dignified affability, and her gentleneſs of diſpoſition, gained her great popularity in England, eſpecially among the Roman Catholics; and as ſhe made many attempts to procure her liberty, and carried on a conſtant correſpondence with foreign powers, Elizabeth became at laſt ſo much afraid of her intrigues, that ſhe determined to cut her off, at whatever hazard. With this view ſhe prevailed upon her ſervile parliament to paſs an act which might make Mary anſwerable for the crimes of all who ſhould call themſelves her partizans; and upon that flagitious ſtatute ſhe was tried as a traitor concerned in the conſpiracy of Babington: (See SCOTLAND). Though the trial was conducted in a manner which would have been illegal even if ſhe had been a ſubject of England, and though no certain proof appeared of her connexion with the conſpirators, ſhe was, to the amazement of Europe, condemned to ſuffer death.

The fair heroine received her ſentence with great compoſure; ſaying to thoſe by whom it was announced, "The news you bring cannot but be moſt welcome, ſince they announce the termination of my miſeries. Nor do I account that ſoul to be deſerving of the felicities of immortality, which can ſhrink under the ſufferings of the body, or ſcruple the ſtroke that ſets it free." On the evening before her execution, for which, on the ſucceeding morn, ſhe prepared herſelf with religious ſolemnity and perfect reſignation, ſhe ordered all her ſervants to appear before her, and drank to them. She even condeſcended to beg their pardon for her omiſſions or neglects; and ſhe recommended it to them to love charity, to avoid the unhappy paſſions of hatred and malice, and to preſerve themſelves ſtedfaſt in the faith of Chriſt. She then diſtributed among them her money, her jewels, and her clothes, according to their rank or merit. She wrote her will with her own hand, conſtituting the duke of Guiſe her principal executor; and to the king and queen of France ſhe recommended her ſon, provided he ſhould prove worthy of their eſteem.—In the caſtle of Fotheringay ſhe was beheaded on the 8th of February 1587, in the 45th year of her age; and her body, after being embalmed and committed to a leaden coffin, was buried with royal pomp and ſplendour in the cathedral of Peterborough. Twenty years afterwards her bones were, by order of her ſon and only child King James I. removed to Weſtminſter, and depoſited in their proper place among the kings of England.

The general character of Mary, which in the regular order of biography ſhould now be laid before the reader, has furniſhed matter of controverſy for 200 years.—She is univerſally allowed to have had conſiderable talents, and a mind highly cultivated. By one party ſhe is painted with more virtues and with fewer defects than almoſt any other woman of the age in which ſhe lived. By another, ſhe is repreſented as guilty of the groſſeſt crimes which a woman can commit—adultery and the murder of her huſband. By all it is confeſſed, that, previous to her connexion with the earl of Bothwell, her life as a Chriſtian was exemplary, and her adminiſtration as a queen equitable and mild; and it has never been denied that ſhe bore her tedious ſufferings with ſuch reſignation and fortitude as are ſeldom found united with conſcious guilt. Theſe are ſtrong preſumptions of her innocence. The moral characters of men change by degrees; and it ſeems hardly conſiſtent with the known principles of human nature, that any perſon ſhould at once plunge deliberately from the ſummit of virtue to the depths of vice; or, when ſunk ſo low, ſhould by one effort recover his original ſtate of elevation. But in this controverſy preſumptions muſt go for nothing. The poſitive evidences which were brought againſt the queen of Scots are ſo concluſive, that if they be genuine ſhe muſt have been guilty; and if they be ſpurious there can be no doubt of her innocence. They conſiſted of a box with letters, contracts, and ſonnets, ſaid to be written by herſelf and ſent to the earl of Bothwell. In addition to theſe, the ſuppoſed confeſſions of the criminals who had ſuffered for the king's murder were originally urged as proofs of her guilt: but thoſe confeſſions are now admitted by all parties to be either wholly forged, or ſo groſsly interpolated, that no ſtreſs whatever can be laid upon them; and during Mary's life it was affirmed by her friends, and not ſufficiently contradicted by her enemies, that the perſons who had accuſed Bothwell, and were doubtleſs his accomplices, inſtead of criminating the queen, had openly proteſted her innocence in their dying moments.

Stuart's History of Scotland.

This box then, with its contents, was the evidence upon which her accuſers had the chief and indeed the only reliance; and it is upon this evidence, whatever it be, that the guilt or innocence of the Scottiſh princeſs muſt finally be determined. It is uniformly affirmed upon the part of the earl of Murray and his faction, that the caſket with the letters and the ſonnets had been left by Bothwell in the caſtle of Edinburgh; that this nobleman, before he fled from Scotland, ſent a meſſenger to recover them; and that they were found in the poſſeſſion of this perſon. The 20th day of June 1567 is fixed as the date of this remarkable diſcovery. The governor of the caſtle at that time was Sir James Balfour. George Dalgleiſh, a ſervant of Bothwell's, is named as his meſſenger upon this errand. He was ſeized, it is ſaid, by the domeſtics of the earl of Morton; and it was the earl of Morton himſelf who made the actual production of the caſket and its contents.

This ſtory is unſupported by vouchers, contains improbabilities, and cannot be reconciled with hiſtory and events. There remains not any authentic or unſuſpicious evidence that the queen had diſhonoured the bed of Lord Darnley; and there is the moſt ſatisfactory evidence*, that though Bothwell was intruſted with the defence of the borders on account of his tried courage and loyalty, he was privately diſliked by Mary for his uncommon zeal in the cauſe of Proteſtantiſm. At the very time when the queen is ſaid to have had the moſt violent love for that nobleman, and with him to have been carrying on the moſt criminal intercourſe againſt her huſband, we know both from Randolph and from Knox, that Bothwell refuſed to gratify her by the ſmalleſt compliance with the ceremonies of her religion, though many of the other Proteſtant peers ſcrupled not to accompany her to the celebration of the maſs. That the villain who could deliberately commit murder, ſhould be ſo ſcrupulouſly conſcientious with reſpect to modes of faith and worſhip, as to ſtand forward with a *peculiar* ſtrain of bravery to oppoſe, in a favourite meaſure, the queen, who was *then* admitting him to her bed, and actually *forming plans* for raiſing him to her throne, is ſurely, to ſay the leaſt of it, extremely improbable.

But let us ſuppoſe this non-compliance on the part of Bothwell to have been a meaſure concerted between the queen and him to conceal more effectually from the eyes of the public the criminal intercourſe in which they were engaged; is it not very ſurpriſing, that of ſuch politicians, the *one* ſhould have *written* thoſe letters, and the *other* have left them in the power of their *enemies*? The earl of Bothwell was expoſed to more than ſuſpicions of a concern in the murder of the king. Theſe papers contained manifeſt proofs of his guilt. It evidently was not his intereſt to preſerve them: or admitting, that till his marriage was ſolemnized with the queen he might look upon them as his beſt ſecurity for the realizing of his ambitious hopes, yet, after that event, when all his former friends had deſerted him, he muſt have felt the ſtrongeſt inducements to deſtroy ſuch a criminal correſpondence; and Mary muſt have been ardently animated with the ſame wiſh. The caſtle of Edinburgh, where the box is ſaid to have been lodged, was at this time entirely at their command; and Sir James Balfour, their deputy, was the creature of Bothwell. If his enemies, who were now in arms againſt him, ſhould poſſeſs themſelves of this box and its contents, his deſtruction was inevitable. From his marriage till the 5th day of June, it was in his power to have deſtroyed the fatal papers; and if they had exiſted, it is not to be imagined that he would have neglected a ſtep ſo expedient, not only for his own ſecurity and reputation, but alſo for thoſe of the queen. During all this time, however, he made no effort to recover his box and letters: he had lodged them in the caſtle of Edinburgh; and there he choſe to leave them in the cuſtody of a man in whom he could not have one particle of affiance. This was exceſſively fooliſh; but his ſubſequent conduct was ſtill more ſo. Upon the 6th day of June, it is evident that he had reaſon to ſuſpect the fidelity of Sir James Balfour, ſince he avoided to take refuge in the caſtle of Edinburgh and fled to Dunbar. He returned, however, with an army in order to fight the rebels. The balance of empire might then ſeem to hang ſuſpended between himſelf and his enemies: and in that ſtate of things, a man of ſuch commodious principles as Balfour appears to have been, might be inclined to do his old friend and patron a ſecret ſervice, both to efface his former perfidy and to create himſelf a new intereſt with him in caſe he ſhould be victorious over the rebels. Yet in theſe critical moments Bothwell neglected to make any application to him for the caſket and the letters! On the 15th of June, all his towering imaginations were at once daſhed to the ground. He had come to Carberry hill, followed by an army and accompanied by a queen; but he fled from it attended only by a ſingle ſervant, and was glad to ſhelter himſelf in the caſtle of Dunbar from the vengeance due to his crimes. Yet in this extremity of diſtreſs he is repreſented as trying a bold experiment, which he had not courage to try when he was fortified with the authority of his ſovereign, and when he was facing the rebels in the field. In the very hour when almoſt every friend had deſerted him, he expected a return of friendſhip from a man who had deſerted him at firſt only becauſe he *ſuſpected him to be in danger*. At this period he ſent his ſervant George Dalgleiſh to wait upon Balfour, the acting governor of the caſtle of Edinburgh, with a requiſition for the box of letters, and to bring back the important charge, through ten thouſand dangers, to Dunbar. Though this man was one of his agents in the murder of the king, and might therefore have been ſafely intruſted with any ſecret, he did not order him, as common ſenſe requires he ſhould have done, to deſtroy the letters as ſoon as he ſhould get them into his poſſeſſion. No! he ſent him to fetch them from the caſtle, as if there was no danger in going thither, no doubt of receiving them there, and no difficulty in carrying them back. * To a traveller in an eaſy chair, all roads are ſmooth, and all days are fine. Accordingly this ſame Dalgleiſh, though the well-known ſervant of Bothwell, makes good his entrance at the gates of the city, though theſe were guarded by 450 harquebuſiers all hoſtile to his maſter, finds his way to the caſtle, and delivers his meſſage. But what is more aſtoniſhing than all, he actually receives the box of letters from Sir James Balfour. This indeed, ſays Mr Whitaker, "is o'erdoing Termagant; it out-herods Herod." Balfour was the ductile ſlave of ſelfiſhneſs. He had with infinite perfidiouſneſs turned againſt his friend, his patron, and his queen, only becauſe he ſaw them oppoſed by a party which he *thought* would prove too ſtrong for them; but now when they were both plunged into the loweſt ſtate of diſtreſs, and branded with the appellation of regicides, his ſelfiſhneſs was ſuddenly changed into generoſity, his meanneſs gave place to exalted ſentiments, and, at the peril of his own life, he performed an heroical act of kindneſs! "In ſuch circumſtances (aſks a contemporary writer), is it to be thought, either that the earl would ſend to the ſaid Sir James, or that the ſaid Sir James would ſend any thing to the earl? Is it likely? Is it credible?" No matter: Bothwell is made to ſend for his papers at a time when his difficulties and his deſpair render it *improbable* that he could *think* of them, and when it was abſolutely *impoſſible* that he could *recover* them. His meſſenger accordingly is intercepted with the caſket; and the adverſaries of the queen, upon the 20th day of June, became poſſeſſed of vouchers with which they might operate her deſtruction. Theſe inconſiſtencies are glaring, and of a force not eaſily to be contended; and the ſtory is open to other objections, which are, if poſſible, greater, and altogether inſurmountable.

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* *Whitaker's Vindication.*

* Whitaker's Vindication.

By comparing different proclamations of the rebels with the ſeveral deſpatches of Throgmorton, who was then Elizabeth's reſident in Scotland, Mr Whitaker has made it appear in the higheſt degree probable, that Dalgleith was *not* ſeized *till* the 17th of July; that he was then, in conſequence of an order iſſued by the court of ſeſſion, apprehended, together with Powrie, another of Bothwell's ſervants, in that nobleman's lodgings in the palace of Holyroodhouſe; and that therefore he could not be the bearer of the letters intercepted by the earl of Morton on the 20th of June. What adds greatly to this probability is the account which the rebels themſelves give of his examination. A few days after he was taken, he was examined, ſay they, judicially, in a council where the earls of Morton and Athol are marked as preſent. It was natural upon this occaſion to make inquiries about the caſket and the papers. No queſtions, however, were put to him on that ſubject. He was not confronted with Sir James Balfour, from whom he had received the caſket; nor with the domeſtics of the earl of Morton, by whom it was ſaid that he had been apprehended. He was kept in priſon many months after this examination; and during a period when the rebels were infinitely preſſed to apologize for their violence againſt the queen, there were opportunities without number of bringing him to a confeſſion. Theſe opportunities, however, were avoided; and there exiſts not the ſlighteſt evidence that the caſket and the papers had ever been in his poſſeſſion. Is it then to be ſuppoſed, that if the caſket and the papers had really been diſcovered with *him*, the eſtabliſhment of a fact ſo important would have been neglected by the adverſaries of the queen? No! they would have eſtabliſhed it by the moſt complete evidence; which they were ſo far from attempting to do, that the earlieſt account which they give of their pretended ſeizure of the letters is dated *fifteen months* after the event itſelf, and nearly *nine months* after the death of Dalgleiſh. To have blazoned their diſcovery at the time they pretend it was made, might have been attended with very diſagreeable conſequences; for Dalgleiſh, who at his execution, aſſerted the innocence of the queen, and actually charged the earls of Murray and Morton as the contrivers of the murder, might have found proof that the caſket could not poſſibly have been intercepted in his cuſtody.

The 20th of June 1567 is fixed as the æra of the diſcovery of the letters. If this diſcovery had been real, the triumph of the enemies of the queen would have been infinite. They would not have delayed one moment to proclaim their joy, and to reveal to her indignant ſubjects the fulneſs and the infamy of her guilt. They preſerved, however, a long and a profound ſilence. It was not till the 4th of December 1567 that the papers received their firſt mark of notice or diſtinction; nor till the 16th of September 1568, that the earl of Morton was ſaid to have intercepted them with Dalgleiſh. From the 20th day of June to the 4th day of December, many tranſactions and events of the higheſt importance had taken place; and the moſt powerful motives that have influence with men had called upon them to publiſh their diſcovery.

covery. They yet made no production of the papers, and ventured not to appeal to them. In the proclamation which they iſſued for apprehending Bothwell, they inveigh againſt his guilt, and expreſs an anxious deſire to puniſh the regicides: yet though this deed was poſterior to the 20th of June, there is no alluſion in it to the diſhonour of the queen; and it contains no mention of the box and the letters. An ambaſſador arrived in this interval from France, to inquire into the rebellion and the impriſonment of the queen; yet they apologized not for their conduct by communicating to him the contents of the caſket. To Throgmorton, who had inſtructions to act with Mary as well as with her adverſaries, they denied the liberty of waiting upon her at Lochleven, where ſhe was detained a cloſe priſoner; and they were earneſt to impreſs him with the idea that her love of Bothwell was incurable. He preſſed them on the ſubject of their behaviour to her. At different times they attempted formally to vindicate themſelves; and they were uniformly vehement on the topic of the love which ſhe bore to that nobleman. Yet they abſtained from producing the letters to him. "They even ſpoke of her to him with *reſpect* and *reverence*;" which ſurely they could not poſſibly have done had they been then in poſſeſſion of the letters. They were ſolicitous to divide the faction of the nobles who adhered to the queen; and there could not have been a meaſure ſo effectual for this end as the production of the caſket and its contents; yet they called no convention of her friends, to ſurpriſe and diſunite them with this fatal diſcovery. They flattered the Proteſtant clergy, attended aſſemblies of the church, inſtilled into them a belief of the queen's being guilty of murder and adultery, and incited Mr Knox to "inveigh againſt her vehemently in his ſermons, to perſuade extremities towards her, and (as Throgmorton continues) to threaten the great plague of God againſt the whole country and nation if ſhe ſhould be ſpared from her *condign puniſhment*;" but they ventured not to excite the fury of theſe ghoſtly fathers by exhibiting to them the box and the letters. They compelled the queen to ſubſcribe a reſignation of her crown; and they had the ſtrongeſt reaſon to be ſolicitous to juſtify this daring tranſaction. The box and the letters would have ſerved as a complete vindication of them; yet they neglected to take any notice of theſe important vouchers; and were contented with reſting on the wild and frivolous pretence that the queen, from fickleneſs and fatigue, was diſguſted with the care of her kingdom.

To the irrefragable proof of the forgery of the letters ariſing from their having been ſo long concealed, it has been replied, that the rebels could not produce them ſooner with any regard to their own ſafety. "* A conſiderable number of their fellow ſubjects, headed by ſome of the moſt powerful noblemen in the kingdom, was combined againſt them. This combination they could not hope to break or to vanquiſh without aid either from France or England. In the former kingdom, Mary's uncles, the duke of Guiſe and the cardinal of Lorrain, were at that period all-powerful, and the king himſelf was devotedly attached to her. The loading the queen, therefore, with the imputation of being acceſſory to the murder of her huſband, would be deemed ſuch an inexpiable crime by the court of France, as muſt cut off every hope of countenance or aid from that quarter. From England, with which the principal confederates had been long and intimately connected, they had many reaſons to expect more effectual ſupport; but to their aſtoniſhment, Elizabeth condemned their proceedings with aſperity. Her high notions of royal authority, and of the ſubmiſſion due by ſubjects, induced her on this occaſion to exert herſelf in behalf of Mary, not only with ſincerity but with zeal: ſhe negotiated, ſhe ſolicited, ſhe threatened. From all theſe circumſtances, the confederates had every reaſon to apprehend that Mary would ſoon obtain her liberty, and by ſome accommodation be reſtored to the whole, or at leaſt to a conſiderable portion, of her authority as ſovereign; and *therefore* they were afraid of the conſequences of accuſing her publicly of crimes ſo atrocious as adultery and murder."

* Robertſon's Hiſt. vol. ii. 8th edit.

This apology for the rebels conſiſts of aſſertions for which there is no evidence, and of arguments which are wholly untenable. There is no evidence that Elizabeth exerted herſelf in behalf of Mary with ſincerity and with zeal. If ſhe had, ſhe would have done more than threaten. An Engliſh army of 3000 men, aided by the Scottiſh combination which continued faithful to the queen, would have overturned the rebel government in the ſpace of a month. It is inconceivable that the rebels were prevented by any apprehenſion of the queen's reſtoration from accuſing her of the crimes of murder and adultery; for we learn from a deſpatch of Throgmorton's dated the 19th of July 1567, that "men of good regard did then boldly and overtly by their ſpeech, utter great rigour and extremity againſt their ſovereign; ſaying, it ſhall not be in the power of any *within* this realm, neither *without*, to keep her from condign puniſhment for her notorious crimes." From another deſpatch of the ſame ambaſſador's, dated five days after the former, we learn, that through him they *actually did* accuſe her to Elizabeth of "incontinency, as well with the earl of Bothwell as with others, and likewiſe of the murder of her huſband, of which, they ſaid, they had as apparent proof againſt her as might be; as well by the teſtimony of *her own handwriting*, which they had recovered, as alſo by ſufficient witneſſes." This teſtimony, however, was not produced till more than four months afterwards; a certain proof, that though it was now in the hands of the manufacturers, it was not yet ready for inſpection.

But let us take the facts of this ableſt antagoniſt of Mary as he has ſtated them, and conſider the argument which they are made to ſupport. It is apparent, from the laſt quoted deſpatch of Throgmorton *, that it could not be unknown, either to the court of France or the court of England, that the rebels were at all events determined to crown the prince, and either to put the queen to death or to keep her a cloſe priſoner for life. Theſe deſperate enterpriſes, however, could not, it ſeems, be carried into effect without the countenance and aid of Elizabeth or Charles: but Elizabeth's notions of regal authority, and of the ſubmiſſion due by ſubjects, were high; and the French king was devotedly attached to the dethroned queen. If this was ſo, common ſenſe ſays, that the buſineſs of the confederates, ſince they expected aid from theſe princes,

* Whitaker.

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princes, was to charge Mary at once with the murder and adultery, and ſupport the charge with the moſt convincing evidence which they had to produce. No! ſays this apologiſt of theirs, Charles IX. would have conſidered ſuch conduct as a crime inexpiable, though he might *certainly* be expected to give them his countenance in putting to death, or keeping in perpetual priſon, for a comparatively venial offence, the queen to whom he was devotedly attached! This is ſtrange reaſoning; but it ſeems not to have occurred to the rebels themſelves. The letters made their firſt appearance in a ſecret council aſſembled by the earl of Murray on the 4th of December 1567; and the reaſon there aſſigned by the confederates for their unwillingneſs to produce them was, "That luif they beare unto hir perſon, wha ſometime was theire ſovereine, and for the reverrance of his majeſtie, whais moder ſhe is, as alſua thay mony gude and excellent gifts and vertues quherewith God ſometimes indowit hir." And they proceed to ſay, that they would not have produced them at all, "gif otherwiſe the ſinceritie of their intentions and proceedings from the beginninge myht be known to forrein nacions and the inhabitants of this ile (of whome mony yet remains in ſuſpence in judgement) ſatisfiet and reſolvit of the richtneſneſs of theire quarrel, and the ſecuritie of them and their poſteritie be ony other meane might be providit and eſtabliſhed." So far were they from dreaming that the production of the letters would injure their cauſe in the court of France, that we ſee they frankly acknowledged that the ſincerity and rectitude of their proceedings could not otherwiſe be manifeſted to foreign nations. In this inſtance they think and talk like reaſonable men; but they do not long preſerve the ſame conſiſtency.

In this act of council the rebels diſcover the greateſt anxiety for their pardon and ſecurity: And "the matter being largelie and with gude deliberacion reſſonit at great length, and upon ſundry daies; at laſt all the ſaid lords, barrones, and others above expremit, can find no other way or moyen how to find or make the ſaid ſecuritie but be oppyngynge and reveling of the truth and *grunde of the hail matter fre the beginninge*, plainlie and uprightlie, &c. Therefore the lords of ſecrete council, &c. deſires it to be found and declarit be the eſtates and haill body of the parliament, that the cauſe and occaſion of the tacking of the queen's perſon upon the 15th daie of Junii laſt by paſt, and holding and detaininge of the ſame within the hous and place of Lochlevin continewallie ſenſyne, preſentlie, and in *all tymes cumming*; and generallie all other things *inventit*, ſpokin, writtin, or donne be them, or onny of them, ſen the tent daie of February laſt by paſt unto the daie and date *heirof*, towiching the ſaied queen hir perſon: that caus, and all things depending theiron, or that onie wiſe maie apperteine theirto, &c. was in the ſaied queen's awin default, in as far as be DIVERS HIR PRIVIE LETTERS WRITTEN AND SUBSCRIVIT WITH HIR AWIN HAND, and ſent by her to James Erll Bothwell, &c.—and be her ungodlie and diſhonourable proceedinge in a privait marriage, ſoddanlie and unproviſitly, it is moſt certain, that ſhe was previe, art and part, and of the actual deviſe and deid of the for-mencionit murther of the king, her lawchfull huſband, our ſoverane lord's father, committit be the ſaid James Erll Bothwell, &c."

Had the letters been really genuine, into the abſurdity of this declaration no man of common ſenſe could poſſibly have fallen. Truth is always conſiſtent with itſelf: but in a ſeries of forgeries contradictions are ſcarcely avoidable. The confederates roſe in rebellion againſt the queen on the 10th of June; they faced her in rebellion at Carberry hill on the 15th; they ſent her away into priſon on the 16th; yet they afterwards juſtified *all* that they had done ſince the *tenth of February* by letters, which, they *ſaid*, they had not till the *twentieth of June!* "This (ſays Mr Whitaker), if we conſider it as folly, is one of the moſt ſtriking and eminent acts of folly that the world has ever beheld. But it ought to be conſidered in a light much more diſhonourable to the rebels; and as knavery, it is one of the rankeſt that has ever been attempted to be impoſed upon the ſons of men." On the 4th of December, it muſt be remembered that they had not fixed *any day* for the diſcovery of the letters. The ſtory of the ſeizure of Dalgleiſh with the caſket was not thought of till near a year afterwards; and when it was invented, they had certainly forgotten the date of their act of council. In that act, therefore, they were free to rove at large; but they roved very incautiouſly. By grounding upon the letters, proceedings prior to the 10th of June, they plainly declare the diſcovery of theſe fatal papers to have been *antecedent to the rebellion*. By grounding upon them their ſecret meetings for ſedition, their private conventions for rebellion, and "every thing inventit, ſpokin, written, or done, be them, or anny of them, reſpecting the queen, Bothwell, or Darnley, ſen the *tent daie of February* laſt by paſt," they even intimate the diſcovery to have been previous to the murder of the king; and yet by their own accounts ſome of the letters were then *actually unwritten*. This is aſtoniſhing; and ſhows the extreme difficulty of carrying to any length a conſiſtent ſeries of falſehoods. Even Murray, Morton, and Lethington, could not do it. They knocked down one ninepine in endeavouring to ſet up another; and they finally threw down all, by making them mutually and ſucceſſively to ſtrike one another.

We have not yet done with this act of council. It was with a view to the approaching convention of the eſtates that it had been formed and managed. It was a preparation for the parliament in which the conſpirators had ſecured their fulleſt ſway, and where they propoſed to effectuate their pardon and ſecurity, and to cate with the letters [illegible] the queen. A[illegible] 1567, the [illegible] [illegible] [illegible] The friends of the [illegible] the queen were [illegible]. [illegible] council. [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

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plenitude of their power, the conſpirators called not the eſtates to a free and honeſt examination of them. This, indeed, had the letters been genuine, would have annihilated for ever all the conſequence of the queen. Upon this meaſure, however, they ventured not. The letters were merely produced in parliament, and an act founded on them; but the queen was not brought from her confinement to defend herſelf, nor was any advocate permitted to ſpeak for her. We learn from a paper of unqueſtionable authenticity *, that "ſindrie nobilmen that was her Grace's favouraris then preſent, buir with all (the rebel proceedings in this parliament), maiſt principellie for ſafety of hir Grace's lyfe, quhilk, or thair coming to parliament, was concludit and ſubſcryvit be ane greit part of hir takeris, to be taken frae hir in meiſt crewel manner, as is notourlie known." By the power of this magic, the friends of Mary were bound faſt. They durſt not venture to queſtion publicly the authenticity of the letters, from their dread of expoſing the queen to the dagger of the aſſaſſin. The parliament, therefore, ſuſtained theſe forgeries as vouchers of her guilt, without ſcrutiny or debate of any kind. The conſpirators, who were themſelves the criminals, were her accuſers and her judges, and paſſed a law exactly in the terms in which the act of ſecret council had before drawn it up.

* See Whitaker's Vindication.

It was neceſſary to deſcribe the letters both in the act of council and in the ordination of parliament; and theſe deeds having fortunately deſcended to poſterity, it is apparent, from a compariſon of them, that between the 4th and the 15th days of December, the letters muſt have undergone very eſſential alterations under the management of the conſpirators. In the act of council the letters are deſcribed expreſsly as "written and *ſubſcrivit* with the queen's awin hand;" but in the act of parliament they are ſaid to be only "*written halilie* with hir awin hand," and there is no intimation that they were *ſubſcribed* by her. Whence ariſes this difference? From a *blunder* in the clerk penning the act of council, ſays one: From a habit contracted by the ſame clerk, which made him *mechanically* add *ſubſcribed* to *written*, ſays another: From the *careleſſneſs* of the writer who tranſcribed the copy of the act of council which has deſcended to us, ſays a third. Theſe ſubterfuges have been expoſed in all their weakneſs by Meſſrs Tytler and Whitaker: but in this abſtract it is ſufficient to obſerve, that they are mere ſuppoſitions, ſupported by no evidence; and that the copy of the act of council which we have was given to the miniſters of Elizabeth by the leaders of the faction, who were neither blundering clerks, nor under the habit of mechanically adding *ſubſcribed* to *written*. Under one form, therefore, the letters were certainly exhibited before the council, and under another form they were produced in parliament; but had they been genuine, they would have appeared uniformly with the ſame face. The clerk of the council was Alexander Hay, a notary public accuſtomed to draw up writings and to atteſt them; and what puts his accuracy with reſpect to the letters beyond all poſſibility of doubt, his deſcription of them is authenticated in the fulleſt manner by the ſignatures of Murray, Morton, and a long train of others who formed the ſecret council. The letters, therefore, were actually preſented to the ſecret council with the cuſtomary appendage of ſubſcription to them. But when theſe artificers of fraud came to reflect more cloſely on the approach of parliament, and to prepare their letters for the inſpection of the friends of Mary, they began to ſhrink at the thoughts of what they had done. To ſubſtantiate the charge by letters under her own hand, they had naturally annexed her own ſubſcription, a letter *unſubſcribed* being a ſoleciſm in evidence. But moſt unfortunately for the cauſe of *complete* forgery, Mary was ſtill in poſſeſſion of her own *ſeal*, and he who fabricated the letters was not an engraver. For this reaſon, "the allegit writings in form of miſſive letters or epiſtles," ſays the biſhop of Roſs, in an addreſs to Elizabeth, "are not *ſellit* or *ſignetit*." They were neither atteſted by her ſubſcription at the bottom, nor ſecured by her ſeal on the outſide. In the ſecret council, where all were equally embarked in rebellion, theſe omiſſions were of no importance. But that letters containing intimations of adultery and of murder, ſhould be ſent by the queen to the earl of Bothwell, with her *ſubſcription* to them, and yet without any guard of a *ſeal* upon them, ſo far exceeds all the bounds of credibility, that they could not expect it to gain the belief of parliament. They were ſtruck with the abſurdity of their plan, and dreaded a detection. They were under the neceſſity of altering it; but they could not ſupply the defect of the ſeal. They, therefore, wrote over the letters anew, and withheld the ſubſcription.

Theſe letters were now as complete as the conſpirators wiſhed them; yet in this ſtate, while they were unſubſcribed and unſealed, they wanted other formalities which are uſual in deſpatches. They were without directions, and they had no dates. They muſt, therefore, have been ſent by the queen to Bothwell as *open* and *looſe papers;* yet they contained evidence againſt herſelf, and againſt him, of the moſt horrid wickedneſs; and Nicholas Hubert, the perſon who is ſaid to have carried moſt of them, was of the loweſt condition, and, as Dr Robertſon characterizes him, "a fooliſh talkative fellow." He would, therefore, ſurely *read* thoſe papers, which are polluted from end to end with open and uncovered adultery, and as ſurely *report* their contents to *others*. Theſe are moſt incredible circumſtances, on the ſuppoſition that the letters are authentic, unleſs the queen was, what none of her enemies ever repreſented her, an abſolute idiot.

The letters in their compoſition bear no reſemblance to the other writings of the queen. They have a vulgarity, an indelicacy, and a coarſeneſs of expreſſion and manner, that by no means apply to her. They breathe nothing of the paſſion of love beſides the impulſes of the ſenſual appetite; and they repreſent a queen, highly accompliſhed, in love with one of her ſubjects, as acting with all the ſneaking humility of a cottager to a peer*. A few inſtances will ſhow this. "*The devil ſinder us*," ſhe is made to exclaim, "and God knit us togidder for ever for the maiſt faithful coupill that ever he unitit: *this is my feith; I will die in it*." "I am," ſhe ſays in another place, "varrey glad to write unto zow quhen the reſt are ſleipand; ſen I cannot ſleip as they do, and *as I wold deſyre*, that is, *in your arms*, my dear lufe." "Seeing to obey zow, my deir lufe, I ſpare *nouther honour, conſcience, hazarde,*

* See Whitaker's Vindication.

Mary.

haſardis, nor greatnes quhatſumever; tak it, I pray zow, in gude part, as from the maiſt faithful luiter that ever ze had, or ever ſall have." "Se not hir (his wife,) quhais *fenzeit* teires ſuld not be ſa mikle preiſit nor eſtemit as the trew and faithful travellis quhilk I ſuſteine for to *merit hir place*." "God give zow, my onlie luife, the hap and proſperitie quilk your *humble* and faithful lufe deſyres unto zou, who *hopis to be ſchortly ane uther thing to you* for the reward of my irkſome travellis." "When I will put you out of doubt, and cleir myſelfe, *refuſe it not*, my dear lufe; and ſuffer me to mak zou ſome prufe be *my obedience*, my faithfulnes, conſtancie, and *voluntary ſubjectioun*, quhilk I tak for the *pleſanteſt gude* that I might reſſeit, *gif ze will accept it*." "Such (ſays Mr Whitaker) was the courtlie *kirtle*, and the homely *mantle*, in which theſe wretched repreſenters of Mary dreſſed themſelves up, for the exhibition of a queen dignified, refined, and elegant;—a queen whom, according to their own account, "God had indowit with mony gude and excellent gifts and virtues!"

The evidence which points to the forgery of the letters is preciſe and inſtructive. In its ſeparate parts, it is powerful and ſatisfactory *. When taken together, and in the union of its parts, it is invincible. But, amidſt all its cogency and ſtrength, there is a circumſtance moſt peculiarly in its favour, and of which it required no aid or aſſiſtance. By this peculiarity, it is caſed completely in ſteel, and armed at every point. The letters have come down to us in the French, the Scottiſh, and the Latin languages. Now the conſpirators affirmed, that they were written by the queen in the French language. But by a critical examination of them in theſe different languages, Mr Goodall demonſtrated, that the pretended French originals are a tranſlation from the Latin of Buchanan, which is itſelf a verſion from the Scotch. This is indeed acknowledged by Dr Robertſon, the ableſt and moſt perſevering of all Mary's enemies, who pretends, that, ſo far as he knows, it never was denied. Determined, however, to ſupport the authenticity of the letters at all events, the ſame elegant and ingenious writer ſuppoſes †, that the French originals are now loſt, but that two or three ſentences of each of thoſe originals were retained, and prefixed to the Scottiſh tranſlation; and that the French editor obſerving this, fooliſhly concluded, that the letters had been written partly in French and partly in Scottiſh. In ſupport of this ſingular hypotheſis, he proceeds to affirm, that "if we carefully conſider thoſe few French ſentences of each letter which ſtill remain, and apply to them that ſpecies of criticiſm by which Mr Goodall examined the whole, a clear proof will ariſe, that there was a French copy, not tranſlated from the Latin, but which was itſelf the original from which both the Latin and Scottiſh have been tranſlated." He accordingly applies this ſpecies of criticiſm, points out a few variations of meaning between what he calls the remaining ſentences of the original French and the preſent Latin; and thinks, that in the former he has diſcovered a ſpirit of elegance which neither the Latin nor the Scottiſh have retained. His critical obſervations have been examined by Mr Whitaker; who makes it apparent as the noon-day ſun, that the doctor has occaſionally miſtaken the ſenſe of the Latin, the French, and even the Scotch; and that he has *forgotten* to point out either the elegance or the ſpirit of any particular clauſes in his pretended originals. The ſame maſterly vindicator of Mary then turns his antagoniſt's artillery againſt himſelf, and demonſtrates, that ſuch variations as he has thought ſufficient to prove the exiſtence of a former French copy, are not confined to the firſt ſentence of each of the three firſt letters, but are extended to other ſentences, and diffuſed over all the letters. Hence he obſerves, that this mode of proving will demonſtrate the *preſent* French, and *every* ſentence in it, to be that very original, which it primarily pretended to be, which Mr Goodall has ſo powerfully proved it not to be, and which even the doctor himſelf dares not aſſert it is. Our limits will not admit of our tranſcribing the obſervations of theſe two illuſtrious critics; nor is it neceſſary that we ſhould tranſcribe them. By acknowledging that "Buchanan made his tranſlation, not from the French but from the Scottiſh copy (of which he juſtly obſerves, that, were it neceſſary, ſeveral critical proofs might be brought)," Dr Robertſon, in effect, gives up his cauſe. Had there been any other French letters than the preſent †, what occaſion had Buchanan for the Scotch, when he himſelf muſt have had poſſeſſion of the originals? It is evident from Mr Anderſon's account, that thoſe letters were tranſlated by Buchanan at London during the time of the conferences. He was one of the aſſiſtants appointed to the rebel commiſſioners, and intruſted with the whole conduct of the proceſs againſt the queen. By him, with Lethington, Macgill, and Wood, the original letters were exhibited, and their contents explained to the Engliſh commiſſioners; and we know from the authentic hiſtory of thoſe papers, that they were neither loſt nor miſlaid for many years afterwards. It cannot be pretended that Buchanan did not underſtand the French; for he paſt moſt of his life in that country, and taught a ſchool there. He was, indeed, a daring zealot of rebellion; but, with all his audacity, he muſt have felt the taſk in which he was engaged a very ungracious one. When he ſat down to defame, in the eyes of all Europe, a queen to whom he owed not only allegiance but alſo perſonal gratitude, it is not conceivable that he could have tranſlated from a *Scotch tranſlation*, had he known any thing of a *French original*; and if the rebel commiſſioners, who were ſaid to produce them, knew nothing of ſuch originals, certainly no body elſe ever did: if they exiſted not with Buchanan, they exiſted nowhere.

Dr Robertſon, however, has another argument againſt Mr Goodall, which he thinks concluſive. Of the eight letters "the five remaining (he ſays) never appeared in Latin: nor is there any proof of their ever being tranſlated into that language. Four of them, however, are publiſhed in French. This entirely overturns our author's hypotheſis concerning the neceſſity of a tranſlation into Latin."—An authentic fact will indeed overturn any hypotheſis; but, moſt unluckily for this argument, the doctor advances the hypotheſis, and the fact reſts with Mr Goodall. It is indeed true that Buchanan *publiſhed* only the three firſt letters in Latin at the end of his Detection; but it does not therefore follow, that the other five were never *tranſlated into that language*. Indeed Mr Whitaker has

* Stuart.

† Diſſertation.

† Tytler's Inquiry.

made it as apparent as any thing can be, that the whole eight were turned into Latin for the uſe of the French tranſlator, who, by his own account, underſtood not the Scotch. He has made it in the higheſt degree probable, that this tranſlator was one [illegible], a French refugee; and he has demonſtrated, that the tranſlation was made in London under the eye of Buchanan himſelf. We do not quote his arguments, becauſe they conſiſt of a great number of obſervations which cannot be abridged; and becauſe the tranſlator himſelf confeſſes every thing which is [illegible] to the cauſe maintained by Mr Goodall. “ [illegible] contras miſas ſur la fin,” [illegible] “ avoient eté eſcrites par la Royne, partie en François, partie en Eſcoſſois; et depuis traduictes ENTIEREMENT en LATIN: mais n'ayant cognoiſſance de la langue Eſcoſſoiſe, j'ay mieux aimé exprimer TOUT ce, que j'ay trouve en LATIN, que, &c. “ This confeſſion (ſays Mr Whitaker) takes a comprehenſive ſweep. It makes *all* the [illegible] letters at leaſt, and the *whole* of *each*, to have been tranſlated into Latin, and from thence to have been rendered into French. It ſtarts no piddling objections about ſentences or half ſentences, at the head or at the tail of any. It embraces all within its wide-ſpread arms. And it proves the fancied exiſtence of a French copy at the time to be all a fairy viſion; the creation of minds that have ſubjected their judgements to their imaginations; the invited dreams of ſelf-deluſion.”

The letters, ſo weak on every ſide, and ſo incapable of ſuſtaining any ſcrutiny, give the marks of ſuſpicion and guilt in all the ſtages of their progreſs. Even with the parliamentary ſanction afforded to them by the three eſtates, which the earl of Murray aſſembled upon the 15th day of December 1567, he felt the delicacy and the danger of employing them *openly* to the purpoſes for which they were invented. For while he was ſcheming with Elizabeth his accuſation of the queen of Scots, he took the precaution to ſubmit privately the letters to that princeſs by the agency of his ſecretary Mr Wood. The object of this ſecret tranſaction, which took place early in the month of June 1568, was moſt flagitious, and preſſes not only againſt the integrity of Murray, but alſo againſt that of the Engliſh queen. Before he would advance with his charge, he ſolicited from her an aſſurance that the judges to be appointed in the trial of Mary would hold the letters to be true and probative.

By the encouragement of Elizabeth, the earl of Murray was prevailed upon to prefer his accuſation *. He was ſoon to depart for England upon this buſineſs. A privy council was held by him at Edinburgh. He took up in it with formality the letters of the queen from the earl of Morton, and gave a receipt for them to that nobleman. That receipt is remarkable and intereſting. It is dated upon the 16th of September 1568, and contains the firſt mention that appears in hiſtory of the diſcovery of the letters as in the actual poſſeſſion of Dalgleiſh upon the 20th of June 1567. This, as we have already noticed, is a very ſuſpicious circumſtance; but it is not the only ſuſpicious circumſtance which is recorded in the receipt. In the act of ſecret council, and in the proceedings of parliament, in December 1567, when the earl of Murray and his aſſociates were infinitely anxious to eſtabliſh the criminality of the queen, the only vouchers of her guilt to which they appealed were the letters; and at that time, doubtleſs, they had prepared no other papers to which they could allude. But in Murray's receipt in September 1568 there is mention of other vouchers beſide the letters. He acknowledges, that he alſo received from the earl of Morton contracts or obligations, and ſonnets or love verſes. Theſe remarkable papers, though ſaid to have been found upon the 20th of June 1567, appeared not till September 1568; and this difficulty is not to be ſolved by thoſe who conceive them to be genuine. The general arguments which affect the authenticity of the letters apply to them in full force; only it muſt be obſerved, that as the original letters were undoubtedly in Scotch, the original ſonnets were as certainly written in French. This has been completely proved by Dr Robertſon, and is fully admitted by Mr Whitaker, who has made it in the higheſt degree probable that Lethinton forged the letters and Buchanan the ſonnets. Be this as it may, the ſonnets have every external and internal evidence of forgery in common with the letters, and they have ſome marks of this kind peculiar to themſelves. In particular, they make the love of Mary ſtill more grovelling than the letters made it; and with a degree of meanneſs, of which the ſoul of Lethington was probably incapable, the author of the ſonnets has made the queen conſider it as “ na lytill honor to be maiſtres of her ſubjects gudis!” In this the dignified princeſs is totally loſt in “ the maid Marien” of her pretended imitators; and Buchanan, who in his commerce with the ſex was a mere ſenſualiſt, forgot on this occaſion that he was perſonating a lady and a queen.

There is, however, in theſe ſonnets, one paſſage of ſingular importance, which we muſt not paſs wholly unnoticed. The queen is made to ſay,

Pour luy auſſi j'ay jetté mainte larme
Premier qu'il fuſt de ce corps poſſeſſeur,
Duquel alors il n'avoit pas le cœur.
Puis me donna un autre dur alarme,
Quand il verſa de ſon ſang mainte dragme.

For him alſo I powrit out mony teiris,
Firſt quhen he made himſelf poſſeſſour of this body,
Of the quhilk *then he had not the heart.*
Efter he did give me an uther hard charge,
Quhen he bled of his blude great quantitie, &c.

If theſe ſonnets could be ſuppoſed to be genuine, this paſſage would overthrow at once all the letters and both the contracts which were produced; and would prove, with the force of demonſtration, that the ſeizure of Mary by Bothwell was *not* with her own conſent; that he actually committed a *rape* upon her; that ſhe had for him *no love:* and that ſhe married him merely as a *refuge to her injured honour.* The ſonnets, however, are undoubtedly ſpurious; but, conſidered in this light, the verſes before us prove with equal force the full conviction in the minds of the rebels of what in an unguarded moment they actually confeſſed to Throgmorton, and was manifeſt to all the world; viz. that “the queen their ſovereign was *led captive*, and by FEAR, FORCE, and (as by many conjectures may be well ſuſpected) others EXTRAORDINARY and more

* Stuart.

more UNLAWFUL means COMPELLED to become bedfellow to another wife's huſband." They prove likewiſe, that after the rape, finding Mary highly indignant at the brutality done her, Bothwell actually ſtabbed himſelf; not, we may believe, with any intention to take away his own life, but merely that by ſhedding many a "drachm" of blood he might mollify the heart of the queen.

But we mean not to purſue the hiſtory of the ſonnets any farther. Though they were undoubtedly invented in aid of the letters, to prove that fundamental principle of the conſpirators,—that the love of Mary to Bothwell was inordinate; yet they are ſo incompatible with hiſtory, and with one another, that they demonſtrate the ſpuriouſneſs of themſelves, and of the evidence which they were intended to corroborate. By thus endeavouring to give an air of nature and probability to their monſtrous fictions, the rebels at once betrayed the fabrication of the whole. They have themſelves ſupplied us with a long and particular journal, to ſhow the true dates of facts; and by that journal have their letters and their ſonnets been demonſtrated to be ſpurious. "The *makers* of theſe papers (ſays Mr Whitaker) have broken through all the barrier of their *own hiſtory*. They have ſtarted aſide from the *orbit* of *their own* chronology. They have taken a flight beyond the bounds of *their own* creation, and have there placed themſelves conſpicuous in the PARADISE OF FOOLS."

This maſs of forgery was clandeſtinely ſhown to Elizabeth's commiſſioners during the conferences at York: (See SCOTLAND). It was ſhown again to the ſame commiſſioners and others during the conferences at Weſtminſter. But neither Mary nor her commiſſioners could ever procure a ſight of a ſingle letter or a ſingle ſonnet. By the biſhop of Roſs and the lord Herries ſhe repeatedly demanded to ſee the papers ſaid to be written by her; but that requeſt, in itſelf ſo reaſonable, Elizabeth, with an audacity of injuſtice of which the hiſtory of mankind can hardly furniſh a parallel, thought fit to refuſe. Mary then inſtructed her commiſſioners to demand *copies* of the letters and ſonnets; and offered even from theſe to demonſtrate in the preſence of the Engliſh queen and parliament, and the ambaſſadors of foreign princes, that the pretended originals were palpable forgeries. Even this demand was denied her; and there is undoubted evidence ſtill exiſting, that neither ſhe nor her commiſſioners had ſo much as a *copy* of theſe criminal papers till after thoſe important conferences had for ſome time been at an end. This laſt demand perplexed Elizabeth; the conferences were ſuddenly broken up; Murray was diſmiſſed with his box to Scotland; and the letters were ſeen no more!

But the letters, we are told, were at Weſtminſter compared with letters of the queen's, and found to be in the ſame Roman hand. They were indeed compared with other writings; but with what writings? This queſtion let Elizabeth's commiſſioners themſelves anſwer. They collated them, they ſay, "with others her letters, which were ſhowed yeſternight, and avowed by THEM (the rebel commiſſioners) to be written by the ſaid queen." This was ſuch a collation as muſt have pronounced them to be idiots *, if we had not known them to be otherwiſe; and ſuch as muſt pronounce them to be *knaves*, as we know them to have been men of ſenſe. Like perſons totally incompetent to the management of buſineſs, but in truth acting miniſterially in the work of profligacy, they compared the letters produced, NOT with letters furniſhed by Mary's commiſſioners, NOT with letters furniſhed even by indifferent perſons, BUT with letters *preſented by the producers themſelves*.—"This (ſays Mr Whitaker) is ſuch an inſtance of impoſition upon Mary and the world, as can ſcarcely be paralleled in the annals of knavery. Many inſtances of impoſition, indeed, occur in the wretched hiſtory of our race; but we can hardly find one, in which the impoſition was ſo groſs, ſo formal, ſo important, and ſo clear. It was very groſs, becauſe it has not a ſhred of artifice to cover its ugly nakedneſs. It was very formal, becauſe it was done by men ſome of whom were of the firſt character in their country; and all were bound by honour, and tied down by oaths, to act uprightly in the buſineſs. It was very important, becauſe no leſs than the reputation of a queen, and the continuance of an uſurpation, depended upon it. And it is very clear, becauſe we have the fact related to us by the commiſſioners themſelves, recorded to their ſhame in their own journal, and tranſmitted by their own hands to poſterity with everlaſting infamy on their heads."

When Tytler's *Inquiry into the Evidence produced by the Earls of Murray and Morton againſt Mary Queen of Scots* was firſt publiſhed, it was reviewed in the Gentleman's Magazine by the late Dr Johnſon. The review, which conſiſts of a brief analyſis of the work, with reflections interſperſed on the force of the evidence, concludes thus:—"That the letters were forged is now made ſo probable, that perhaps they will never more be cited as teſtimonies." Subſequent experience has ſhown, that the great critic's knowledge of human nature had not deſerted him when he guarded his prediction with the word *perhaps*. Few authors poſſeſs the magnanimity of Fenelon: and it is not to be expected that he who has once maintained the letters to be genuine, ſhould by reaſoning or criticiſm be compelled to relinquiſh them: but we are perſuaded, that, after the preſent generation of writers ſhall be extinct, theſe letters and ſonnets will never be cited as evidence, except of the profligacy of thoſe by whom they were fabricated.

Such is a view (partial it may be deemed by ſome) of this remarkable controverſy previous to the publication of Mr Laing's Hiſtory of Scotland. But, in oppoſition to all theſe arguments againſt the genuineneſs and authenticity of the letters and ſonnets attributed to Mary, this hiſtorian obſerves, that it is impoſſible to fix the ſuppoſed forgery on any one of the different perſons to whom it has been aſcribed, which, if true, renders it abundantly evident, that they muſt have been the genuine productions of the ill-fated Mary. According to Mr Laing, it was neceſſary for Mary to diſavow the letters; and conſequently her commiſſioners were inſtructed to affirm that they were forged, and that there were diverſe of each ſex in Scotland, particularly of thoſe in company with her adverſaries, who could counterfeit and write the queen's hand, as well as herſelf. This ſtrange aſſertion, ſo apparently falſe, is repeated in Leſly's memorial to Elizabeth; but of thoſe who could write and counterfeit the queen's hand, none were ever named, even in his defence of her honour; and the ſuppoſed forgers could he fixed on no particular perſon during Mary's life, which, it muſt be confeſſed, renders their forgery extremely ſuſpicious. The writings diſperſed in England were Leſly's and other anonymous vindications of Mary, in which there is no intimation whatever of Lethington's confeſſion, *that he had frequently forged the queen's hand*. The letters are thoſe in the Cecil collection, and the Cotton library, which are equally ſilent; and we muſt conclude, that the author, whether Cotton, James, or Camden, improving on Norfolk's apology, that Lethington *moved* him to conſider the queen as not guilty, aſſerted gratuitouſly that Lethington acknowledged the whole forgery, as he had already done, that Buchanan frequently repented on his deathbed, of thoſe calumnies which he reprinted in his hiſtory, at that time in the preſs. He who examines with care, Camden's mutilated account of the conferences in England, muſt be ſatisfied that the evidence of the Cecil and Cotton papers, which he confeſſedly examined, has been ſuppreſſed in his annals, in which Norfolk's letters from York are induſtriouſly concealed. Mr Laing is of opinion, that the ſonnets aſcribed to Mary, are as certainly the productions of her pen, and that the groſſneſs of ſome of them can only be a prevailing argument for their forgery with thoſe who are ignorant of the groſſneſs of the age, or fooliſh enough to believe with Goodall, that Mary never once betrayed a ſingle foible from the cradle to the grave.

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* Whitaker.

As to the three contracts of marriage between the queen and Bothwell, reckoned forgeries by ſome authors, Mr Laing is alſo of opinion that they are the genuine productions of Mary, who was glad to get rid of a huſband whoſe diſſolute manners had rendered him odious in her eyes; and ſhe expreſſed no genuine ſorrow after his extraordinary and atrocious murder. He thinks that there is not to be found in any authentic hiſtory of thoſe times, a ſingle convincing argument of their being forgeries. In a word, after much ingenious criticiſm on the merits of the contracts, he concludes by ſaying, that the private, inſtead of being a copy or abſtract from the public contract, is evidently the original from which the latter was formed; and it is obſervable that the two firſt contracts written by Mary, or under her inſpection, are far ſuperior in delicacy to the laſt: a circumſtance in vain imputed to the art of the forgers, who, in fact, were more deſirous to aggravate than to extenuate the groſſneſs of her guilt (B).

She wrote, 1. Poems on various occaſions, in the Latin, French, and Scotch languages. One of her poems is printed among thoſe of A. Blackwood; another in Brantome's *Dames illuſtres*, written on the death of her firſt huſband Francis. 2. Conſolation of her long impriſonment, and royal advice to her ſon. 3. A copy of verſes, in French, ſent with a diamond ring to Queen Elizabeth. There is a tranſlation of theſe verſes among the Latin poems of Sir Thomas Chaloner. 4. Genuine Letters of Mary Queen of Scots, to James earl of Bothwel; tranſlated from the French, by E. Simmonds, 1726. There are, beſides, many other of her epiſtles to Queen Elizabeth, Secretary Cecil, Mildmay, &c. which are preſerved in the Cottonian, Aſhmolean, and other libraries.

MARY II. queen of England, eldeſt daughter of James II. by his firſt wife, was born at St James's in 1662. She was bred up a Proteſtant, and married to William Henry of Naſſau, then prince of Orange, afterwards king of England, in the 16th year of her age. She ſtaid in Holland with her huſband till February 12. 1689, when ſhe came over, and was ſolemnly proclaimed queen of England, &c. She was an equal ſharer with her huſband in all the rights belonging to the crown; but the adminiſtration and execution thereof were lodged ſolely in the king. She was a princeſs endowed with the higheſt perfections both of body and mind: ſhe loved hiſtory, as being proper to give her uſeful inſtructions; and was alſo a good judge as well as a lover of poetry. She ſtudied more than could be imagined, and would have read more than ſhe did, if the frequent returns of ill humours in her eyes had not forced her to ſpare them. She gave her minutes of leiſure to architecture and gardening; and ſince it employed many hands, ſhe ſaid, ſhe hoped it would be forgiven her. She was the moſt gracious of ſovereigns to her ſubjects, and the moſt obliging of wives to her huſband, as well as the moſt excellent of miſtreſſes to her ſervants: ſhe ordered good books to be laid in the places of attendance, that perſons might not be idle while they were in their turns of ſervice. She was exceeding zealous for a reformation of manners; charitable in the higheſt degree, without the leaſt oſtentation. This excellent queen died on the 28th of December 1695, at Kenſington, of the ſmallpox, in the 33d year of her age. In her the arts loſt a protectreſs, the unfortunate a mother, and the world a pattern of every virtue. As to her perſon ſhe was tall, of a majeſtic graceful mein, her countenance ſerene, her complexion ruddy, and her features beautiful.

MARY Magdalen's Day, a feſtival of the Romiſh church, obſerved on the 22d of July.

MARY Gerane's-Hole, a name given to Dunmore-head, in the pariſh of Dunqueen, county of Kerry, and province

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(B) This article ſtands in need of an apology; but whether for its length or its ſhortneſs, our readers may perhaps differ in opinion. If it be conſidered as a piece of common biography, and compared with the limits which we have preſcribed to our other articles of the ſame kind, it has ſwelled to an extent beyond all proportion. But as a piece of common biography it ought not to be conſidered: it is intimately connected with the hiſtory of Scotland at a very intereſting period; and it has been juſtly obſerved, by one of the ableſt writers of the age, that "the fact under diſpute in the life of Mary, is a fundamental and eſſential one; and that, according to the opinion which the hiſtorian adopts with regard to it, he muſt vary and diſpoſe the whole of his ſubſequent narrative." Viewed in this light, our abſtract of the evidence which has been urged on both ſides of this controverſy will by many be deemed too ſhort. To thoſe who wiſh for complete ſatisfaction, we can only recommend the unbiaſſed ſtudy of the writings of *Buchanan*, *Leſly* Biſhop of Roſs, *Goodall*, *Robertſon*, *Hume*, *Tytler*, *Sir David Dalrymple*, *Stuart*, *Whitaker*, and *Laing*.

province of Munſter, in Ireland. It is the moſt weſtern point of all Europe, and called by the Iriſh *Ty Forny Conane*. It is a point as much celebrated by them as John o' Groat's houſe by the Scots, which is the utmoſt extremity of North Britain.

MARYBOROUGH, a borough, market, and poſt town, and the aſſizes town to Queen's county, in the province of Leinſter, in Ireland; ſo called in honour of Mary queen of England, who reduced this part of the country to ſhire-ground by act of parliament 6th and 7th Philip and Mary. It is governed by a burgomaſter and bailiffs, and has a barrack for a troop of horſe. It formerly returned two members to parliament. It is diſtant from Dublin 42 miles. N. Lat. 53. 0. W. Long. 7. 20.

MARYBURGH. See *Fort William*.

MARYGOLD. See CALTHA, BOTANY *Index*.

Corn Marygold. See CHRYSANTHEMUM, BOTANY *Index*.

French Marygold. See TAGETES, BOTANY *Index*.

MARYLAND, one of the Thirteen United States of America. It received that name in honour of Henrietta Maria, the conſort of King Charles I. who made a grant of this country, with very extraordinary powers, to Lord Baltimore. It lies between 38 and 40 degrees north latitude, and in longitude from 74 to 78 degrees weſt from London. It is bounded on the north by Pennſylvania; on the eaſt by the Delaware ſtate; on the ſouth-eaſt and ſouth by the Atlantic ocean, and a line drawn from the ocean over the peninſula (dividing it from Accomack county in Virginia) to the mouth of Patomack river, thence up the Patomack to its firſt fountain, thence by a due north line till it interſects the ſouthern boundary of Pennſylvania, in Lat. 39° 43′ 18″; ſo that it has Virginia on the ſouth, ſouth-weſt, and weſt. It contains about 14,000 ſquare miles, of which about one-ſixth is water. It is divided into 18 counties, 10 of which are on the weſtern and 8 on the eaſtern ſhore of Cheſapeak bay, St Mary's, Somerſet, Calvert, Montgomery, Waſhington, Queen Ann's, Caroline, Kent, Charles, Talbot, Dorcheſter, Baltimore, Ann Arundel, Worceſter, Hartford, Cecil, Frederick, and Prince George's. Each of the counties ſends four repreſentatives to the houſe of delegates; beſides which the city of Annapolis and town of Baltimore ſend each two, making in the whole 76 members. The climate is generally mild and agreeable, ſuited to agricultural productions and a great variety of fruit trees. In the interior hilly country the inhabitants are healthy: but in the flat country, in the neighbourhood of the marſhes and ſtagnant waters, they are, as in the other ſouthern ſtates, ſubject to intermittents. Cheſapeak bay divides this ſtate into the eaſtern and weſtern diviſions. It affords ſeveral good fiſheries; and, in a commercial view, is of immenſe advantage to the ſtate. It receives a number of the largeſt rivers in the United States. From the eaſtern ſhore in Maryland, among other ſmaller ones, it receives Pokomoke, Choptank, Cheſter, and Eik rivers; from the north the rapid Suſquehannah; and from the weſt Patapſco, Severn, Patuxent, and Patomack, half of which is in Maryland and half in Virginia. Except the Suſquehannah and Patomack, theſe are ſmall rivers. Eaſt of the blue ridge of mountains, which ſtretches acroſs the weſtern part of this ſtate, the land, like that in all the ſouthern ſtates, is generally level and free of ſtones. Wheat and tobacco are the ſtaple commodities of Maryland. In the interior country, on the uplands, conſiderable quantities of hemp and flax are raiſed.

The number of inhabitants in this ſtate, including the negroes, is 254,050; which is 18 for every ſquare mile. The inhabitants, except in the populous towns, live on their plantations, often ſeveral miles diſtant from each other. To an inhabitant of the middle, and eſpecially of the eaſtern ſtates, which are thickly populated, they appear to live very retired and unſocial lives. The effects of this comparative ſolitude are viſible in the countenances as well as in the manners and dreſs of the country people; there being among them very little of that cheerful ſprightlineſs of look and action which is the invariable and genuine offſpring of ſocial intercourſe; nor do they pay that attention to dreſs which is common, and which decency and propriety have rendered neceſſary, among people who are liable to receive company almoſt every day. As the negroes perform all the manual labour, their maſters are left to ſaunter away life in ſloth, and too often in ignorance. Theſe obſervations, however, muſt in juſtice be limited to the people in the country, and to thoſe particularly whoſe poverty or profeſſion prevents their ſpending a part of their time in populous towns or otherwiſe mingling with the world.

The chief towns in this ſtate are Annapolis and Baltimore.——*Annapolis*, the capital, and the wealthieſt town of its ſize in America, is ſituated juſt at the mouth of Severn river, 30 miles ſouth of Baltimore. The houſes are generally large and elegant; and the ſtadthouſe is the nobleſt building of the kind in America.—*Baltimore* has had the moſt rapid growth of any town on the continent, and is the fourth in ſize and the fifth in trade in the United States. It lies in Lat. 39. 21. on the north ſide of Patapſco river, around what is called the Baſon. The ſituation of the town is low. The houſes were numbered in 1787, and found to be 1955; about 1200 of which were in the town, and the reſt at Fell's point. The number of ſtores was 152; and of churches 9, which belong to German Calviniſts and Lutherans, Epiſcopalians, Preſbyterians, Roman Catholics, Baptiſts, Methodiſts, Quakers, Nicolites, or New Quakers. The number of inhabitants is between 10,000 and 11,000. There are many very reſpectable families in Baltimore, who live genteelly, are hoſpitable to ſtrangers, and maintain a friendly and improving intercourſe with each other; but the bulk of the inhabitants, recently collected from almoſt all quarters of the world, bent on the purſuit of wealth, varying in their habits, their manners, and their religions, if they have any, are unſocial, unimproved, and inhoſpitable. The trade of Maryland is principally carried on from Baltimore, with the other ſtates, with the Weſt Indies, and with ſome parts of Europe. To theſe places they ſend annually about 30,000 hogſheads of tobacco, beſides large quantities of wheat, flour, pig iron, lumber, and corn,—beans, pork, and flax ſeed, in ſmaller quantities; and receive in return, clothing for themſelves and negroes, and other dry goods, wines, ſpirits, ſugars, and other Weſt India commodities. The balance is generally in their favour.

The Roman Catholics, who were the firſt ſettlers in Maryland, are the moſt numerous religious ſect. Beſides theſe, there are Proteſtant Epiſcopalians, Engliſh, Scotch, and Iriſh Preſbyterians, German Calviniſts, German Lutherans, Friends, Baptiſts, Methodiſts, and Nicolites, or New Quakers. The colleges in this ſtate have all been founded ſince the year 1782, and are yet in their infancy. The names of the ſeveral ſeminaries are, Waſhington College at Cheſtertown, inſtituted in 1782; St John's College at Annapolis, founded in 1784; Cakeſbury College at Abingdon, inſtituted by the Methodiſts in 1785; and a college founded by the Roman Catholics at Georgetown. There are a few other literary inſtitutions, of inferior note, in different parts of the ſtate, and proviſion is made for free ſchools in moſt of the counties: though ſome are entirely neglected, and very few carried on with any ſucceſs; ſo that a great proportion of the lower claſs of people are ignorant, and there are not a few who cannot write their names. But the revolution, among other happy effects, has rouzed the ſpirit of education, which is faſt ſpreading its ſalutary influences over this and the other ſouthern ſtates.

The legiſlature of this ſtate is compoſed of two diſtinct branches, a ſenate and houſe of delegates; and ſtyled *The General Aſſembly of Maryland*. The ſenate conſiſts of 15 members, choſen every five years. Nine of theſe muſt be reſidents on the weſtern ſhore and ſix on the eaſtern; they muſt be more than 25 years of age, muſt have reſided in the ſtate more than three years next preceding the election, and have real and perſonal property above the value of 1000l. The houſe of delegates is compoſed of four members for each county, choſen annually on the firſt Monday in October. The city of Annapolis and town of Baltimore ſend each two delegates. The qualifications of a delegate, are, full age, one year's reſidence in the county where he is choſen, and real or perſonal property above the value of 500l. The qualifications of a freeman are, full age, a freehold eſtate of 50 acres of land, and actual reſidence in the county where he offers to vote; property to the value of 30l. in any part of the ſtate, and a year's reſidence in the county where he offers to vote.

On the ſecond Monday of November annually a governor is appointed by the joint ballot of both houſes. The governor cannot continue in office longer than three years ſucceſſively, nor be elected until the expiration of four years after he has been out of office. The qualifications for the chief magiſtracy are 25 years of age, five years reſidence in the ſtate next preceding the election, and real and perſonal eſtate above the value of 5000l.; 1000l. of which muſt be freehold eſtate. This conſtitution was eſtabliſhed by a convention of delegates at Annapolis, Auguſt 14. 1776.

Maryland was granted, as has been already noticed, by King Charles I. to Cecilius Calvert, baron of Baltimore in Ireland, June 20. 1632. The government of the province was by charter veſted in the proprietary; but it appears that he either never exerciſed theſe powers alone, or but for a ſhort time. The honourable Leonard Calvert, Eſq. Lord Baltimore's brother, was the firſt governor or lieutenant general. In 1638, a law was paſſed, conſtituting the firſt regular houſe of aſſembly, which was to conſiſt of ſuch repreſentatives, called *burgeſſes*, as ſhould be elected purſuant to writs iſſued by the governor. Theſe burgeſſes poſſeſſed all the powers of the perſons electing them; but any other freemen, who did not aſſent to the election, might take their ſeats in perſon. Twelve burgeſſes or freemen, with the lieutenant general and ſecretary, conſtituted the aſſembly or legiſlature. This aſſembly ſat at St Mary's, one of the ſouthern counties, which was the firſt ſettled part of Maryland. In 1687, the government was taken out of the hands of Lord Baltimore by the grand convention of England. Mr Copley was appointed governor by commiſſion from William and Mary in 1692, when the Proteſtant religion was eſtabliſhed by law. In 1716, the government of this province was reſtored to the proprietary, and continued in his hands till the late revolution; when, being an abſentee, his property in the lands was confiſcated, and the government aſſumed by the freemen of the province, who formed the conſtitution now exiſting. At the cloſe of the war, Henry Harford, Eſq. the natural ſon and heir of Lord Baltimore, petitioned the legiſlature of Maryland for his eſtate; but his petition was not granted. Mr Harford eſtimated his loſs of quit-rents, valued at 20 years purchaſe, and including arrears, at 259,488l. 5s.—dollars at 7s. 6d. and the value of his manors and reſerved lands at 327,441l. of the ſame money.

MARYPORT, a ſea port town of Cumberland, ſituated at the mouth of the Elne. It has a good harbour; and has 70 or 80 ſail of ſhipping from 30 to 250 tons burden, principally employed in the coal trade; ſome of them ſail up the Baltic for timber, flax, iron, &c. They have a furnace for caſt iron and a glaſs-houſe. A chapel was erected here in 1760.

MAS, Lewis du, natural ſon to Jean Louis de Montcalm Seigneur de Candiac, and a widow of rank of Rouergue, was born at Niſmes in 1676. His firſt attention was beſtowed on juriſprudence; but afterwards he was altogether occupied with mathematics, philoſophy, and the ſtudy of the languages. Father Malebranche cultivated his acquaintance and eſteemed his virtues. His firſt appearance was ſevere, his general temper tranquil; yet he had a lively and fertile imagination. His mind was active, full of reſources, and methodical. We are indebted to his induſtry for the Typographical Bureau. This invention is the more ingenious, as it preſents the tedious parts of education, namely, reading, writing, and the elements of languages, to the youthful mind as a delightful entertainment; and many people in France, both in the capital and in the provinces, have adopted it with ſucceſs. After he had conceived the idea of this invention, he made the firſt trial of it on the young Candiac, who was remarkable for his underſtanding in his earlieſt years. Du Mas conducted his pupil to Paris and the principal cities in France, where he was univerſally admired. This prodigy was carried off in the year 1726 before he was ſeven years of age, and his loſs had nearly deprived Du Mas of his reaſon. A dangerous illneſs was the conſequence of his vexation; and he would have died of want, if a gentleman had not taken him from his garret and entertained him in his own houſe. Du Mas afterwards retired with Madame de Vaujour within two leagues of Paris, and died in the year 1774, againſt 68. He was a philoſopher both in genius and character. His works are, 1. *L'Art de tranſpoſer toutes ſortes de Muſiques ſans etre obligé de connoitre, ni le temps, ni le mode*, publiſhed at Paris in 4to. 1711. This work is extremely curious, but of no advantage to the ſtudy of muſic. 2. A volume in quarto, printed at Paris 1733, in four parts, entitled, *Bibliotheque des enfans*. In this treatiſe he has placed, in a clear point of view, the ſyſtem and economy of his Typographical Bureau. This invention, like every thing new, was cenſured by ſome and admired by others. The author himſelf defended it with much ſucceſs in the journals and in ſeveral occaſional pamphlets. This collection, however, is become exceedingly ſcarce. The Typographical Bureau was brought to perfection by M. Reybert a citizen of Avignon, who enriched it with many articles containing uſeful and agreeable information in geography, hiſtory, fable, &c. &c. 3 *Memoires de l'Ecoſſe ſous le regne de Marie Stuart*, by Crawford, and tranſlated from the Engliſh. This tranſlation was found in manuſcript in the library of the marquis d'Aubais, with whom Du Mas had lived in the moſt intimate habits of friendſhip.

Mas Planta, a plant which upon the ſame root produces male flowers only. See *Masculus Flos*, Botany *Index*.

MASAFUERO, an iſland of the South ſea, lying in S. Lat. 33. 45. W. Long. 80. 46. It is very high and mountainous, and at a diſtance ſeems to conſiſt of one hill or rock. It is of a triangular form, and ſeven or eight leagues in circumference. There is ſuch plenty of fiſh, that a boat with a few hooks and lines may very ſoon catch as many as will ſerve 100 people. Here are coal-fiſh, cavilliers, cod, hallibut, and cray fiſh. Captain Carteret's crew caught a kingfiſher that weighed 87 pounds, and was five feet and a half long. The ſharks were here ſo ravenous, that, in taking ſoundings, one of them ſwallowed the lead, by which they hauled him above water; but he regained his liberty by diſgorging his prey. Seals are ſo numerous here, that Captain Carteret ſays, if many thouſands were killed in a night, they would not be miſſed next morning. Theſe animals yield excellent train oil; and their hearts and plucks are very good food, having a taſte ſomething like thoſe of a hog; their ſkins are covered with a very fine fur. There are many birds here, and ſome very large hawks. Of the pintado bird one ſhip caught 700 in one night. Commodore Byron landed here with difficulty in 1765, in order to take in wood and water, of both which he found plenty. He found alſo great numbers of goats, whoſe fleſh taſted as well as veniſon in England.

MASBOTHÆI, or Mesbothæi, the name of a ſect, or rather of two ſects; for Euſebius, or rather Hegeſippus whom he cites, makes mention of two different ſects of Maſbothæans. The firſt was one of the ſeven ſects that roſe out of Judaiſm, and proved very troubleſome to the church; the other was one of the ſeven Jewiſh ſects before the coming of Jeſus Chriſt.

The word is derived from the Hebrew שבת, *ſchabat*, "to reſt or repoſe," and ſignifies *idle eaſy indolent people*. Euſebius ſpeaks of them as if they had been ſo called from one Maſbothæus their chief: but it is much more probable that their name is Hebrew, or at leaſt Chaldaic, ſignifying the ſame thing with a Sabbatarian in our language; that is, one who makes profeſſion of keeping Sabbath.

Valeſius will not allow the two ſects to be confounded together: the laſt being a ſect of Jews before, or at leaſt contemporary with Chriſt; and the former a ſect of heretics deſcended from them. Rufinus diſtinguiſhes them in their names; the Jewiſh ſect he calls Maſbuthæi; and the heretics Maſbuthæani. The Maſbuthæans were a branch of the Simonians.

MASCULINE, ſomething belonging to the male, or the ſtronger of the two ſexes. See Male.

Masculine, is more ordinarily uſed in grammar to ſignify the firſt and worthieſt of the genders of nouns. See Gender.

The maſculine gender is that which belongs to the male kind, or ſomething analogous to it.

Moſt ſubſtances are ranged under the heads of maſculine or feminine.—This, in ſome caſes, is done with a ſhow of reaſon; but in others is merely arbitrary, and for that reaſon is found to vary according to the languages and even according to the words introduced from one language into another.—Thus the names of trees are generally feminine in Latin and maſculine in the French.

Farther, the genders of the ſame word are ſometimes varied in the ſame language. Thus *alvus*, according to Priſcian, was anciently maſculine, but is now become feminine. And *navire*, "a ſhip," in French, was anciently feminine, but is now maſculine.

Masculine Rhyme, in the French poetry, is that made with a word which has a ſtrong, open, and accented pronunciation; as all words have, excepting thoſe which have an *e* feminine in their laſt ſyllable. For inſtance, *amour* and *jour*, *mort* and *fort*, are maſculine rhymes; and *pere* and *mere*, *gloire* and *memoire*, are feminine. Hence alſo verſes ending with a maſculine rhyme, are called *maſculine verſes*, and thoſe ending with a feminine rhyme, *feminine verſes*. It is now a rule eſtabliſhed among the French poets never to uſe the above two maſculine or two feminine verſes ſucceſſively, except in the looſer kind of poetry. Marot was the firſt who introduced this mixture of maſculine and feminine verſes, and Ronſard was the firſt who practiſed it with ſucceſs. The maſculine verſes ſhould always have a ſyllable leſs than the feminine ones.

Masculine Signs. Aſtrologers divide the ſigns into maſculine and feminine; by reaſon of their qualities, which are either active, and hot or cold, accounted maſculine; or paſſive, dry and moiſt, which are feminine.—On this principle they call the Sun, Jupiter, Saturn, and Mars, *maſculine;* and the Moon and Venus *feminine*. Mercury, they ſuppoſe, partakes of the two. Among the ſigns, Aries, Libra, Gemini, Leo, Sagittarius, Aquarius, are maſculine: Cancer, Capricornus, Taurus, Virgo, Scorpio, and Piſces, are feminine.

MASCULUS flos. See Flos, Botany *Index*.

MASH, a drink given to a horſe, made of half a peck of ground malt put into a pail, into which as much ſcalding hot water is poured as will wet it very well: when that is done, ſtir it about, till, by taſting, you find it as ſweet as honey; and when it has ſtood till it is lukewarm, it is to be given to the horſe. This

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liquor is only uſed after a purge, to make it work the better; or after hard labour, or inſtead of drink in the time of any great ſickneſs.

MASK. See Masque.

MASINISSA, a king of a ſmall part of Africa, who at firſt aſſiſted the Carthaginians in their wars againſt Rome; but afterwards joined the Romans, and became the firmeſt ally they ever had. See Numidia.

MASON, a perſon employed under the direction of an architect, in the raiſing of a ſtone building.

The chief buſineſs of a maſon is to make the mortar; raiſe the walls from the foundation to the top, with the neceſſary retreats and perpendiculars; to form the vaults, and employ the ſtones as delivered to him. When the ſtones are large, the buſineſs of hewing or cutting them belongs to the ſtonecutters, though theſe are frequently confounded with maſons: the ornaments of ſculpture are performed by carvers in ſtones or ſculptors. The tools or implements principally uſed by them are the ſquare, level, plumb line, bevel, compaſs, hammer, chiſſel, mallet, ſaw, trowel, &c. See Square, &c.

Beſides the common inſtruments uſed in the hand, they have likewiſe machines for raiſing of great burdens, and the conducting of large ſtones; the principal of which are the lever, pulley, wheel, crane, &c. See Lever, &c.

Mason, *William*, an Engliſh poet of diſtinction, born in 1725, was the ſon of a clergyman who held the living of Hull. He took his firſt degrees at St John's college, Cambridge in 1745, whence he removed to Pembroke college, of which he was admitted a fellow in 1747. He was M. A. in 1749, a miniſter in 1754. The earl of Holderneſſe preſented him to the valuable rectory of Aſton in Yorkſhire, and procured for him the office of chaplain to his majeſty. His ode on the inſtallation of the duke of Newcaſtle as chancellor of the univerſity of Cambridge was the firſt ſpecimen of his poetical talents, which gained him conſiderable reputation, although the ſubject was not popular. His monody to the memory of Pope, and Iſis, an elegy, added to his fame, which was ſtill farther increaſed by his dramatic poem of Elfrida in 1752, and Caractacus in 1759.

He did not ſucceed in writing tragedy as he did not compoſe for the modern ſtage, but wiſhed to revive the manner of the ancients. He publiſhed a ſmall collection of odes in 1756, intended as an imitation of his dear friend Gray. He gave the world ſome elegies in 1763, which in general are marked with the ſimplicity of language proper to this ſpecies of compoſition, breathing noble ſentiments of freedom and of virtue. In point of morality he may juſtly be conſidered as the pureſt of poets, and one of the warmeſt friends of civil liberty by which the age he lived in was diſtinguiſhed. The firſt book of his Engliſh Garden made its appearance in 1772, a didactic poem in blank verſe, of which the fourth and laſt book was printed in the year 1781. Some good critics conſider this poem as rather ſtiff, and the dry minuteneſs of the preceptive part, prevented it from bringing the author any great degree of popularity. In 1775 he publiſhed the poems of Mr Gray, to which he prefixed memoirs of his life and writings. His obſervations on the character and genius of his friend did honour to his taſte and feelings, and of conſequence the volume was favourably received.

At the place of his reſidence he acted with the friends of reform, and the enemies of ſuch meaſures as were deemed incompatible with the liberties of freemen. During the continuance of the American war, he addreſſed an ode to the naval officers of Great Britain, on the acquittal of Admiral Keppel in 1779, in which he decidedly execrated the war carrying on againſt the people of America. When Mr Pitt roſe to power in 1782, Maſon addreſſed an ode to him, which contained patriotic and manly ſentiments, but his lyric imagery did it conſiderable injury. He publiſhed in 1783 a poetical tranſlation of Freſnoy's Latin poem on the art of painting, which unites great elegance of language and verſification with a correct repreſentation of a difficult original.

Beſides the living with which he was preſented ſoon after taking orders, he obtained the preferments of precentor and canon reſidentiary of the cathedral of York. At that church he preached an occaſional diſcourſe in 1788 on the ſubject of the ſlave-trade, full of animated declamation againſt the inhumanity of the traffic. The centenary commemoration of the revolution in that year produced his ſecular ode, which breathed his uſual ſpirit of freedom. An additional volume of his poems was given to the world in 1797, conſiſting of miſcellaneous pieces, the reviſed productions of his youth, and the effuſions of his old age. In his Palinody to Liberty we behold the change wrought in his political principles by the melancholy events of the French revolution.

Mr Maſon died in April 1797, at the age of 72, the conſequence of a mortification by a hurt in his leg. He had married an amiable lady, who died of a conſumption in 1767, and was buried at Briſtol cathedral, under a monument on which are inſcribed ſome very tender and beautiful lines by her huſband. The character of Maſon in private life was exemplary for worth and active benevolence. A tablet has been placed to his memory in Poets Corner in Weſtminſter abbey. Some ſatirical pieces of merit have been aſcribed to him, but ſome are of opinion that the internal evidence is ſufficient to decide againſt his title to them; yet it muſt be allowed that he could write with energy and ſimplicity, and the objects of ſatire in theſe pieces are ſuch as it was extremely próbable that he would fix upon.

MASONRY, in general, a branch of architecture, conſiſting in the art of hewing or ſquaring ſtones, and cutting them level or perpendicular, for the uſes of building: but, in a more limited ſenſe, maſonry is the art of aſſembling and joining ſtones together with mortar.

Hence ariſe as many different kinds of maſonry as there are different forms and manners for laying or joining ſtones. Vitruvius mentions ſeveral kinds of maſonry uſed among the ancients; three of hewed ſtone, viz. that in form of a net, that in binding, and that called the *Greek maſonry;* and three of unhewed ſtones, viz. that of an equal courſe, that of an unequal courſe, and that filled up in the middle; and the ſeventh was a compoſition of all the reſt.

Net maſonry, called by Vitruvius *reticulatum*, from its reſemblance to the meſhes of a net, conſiſts of ſtones ſquared in their courſes, and ſo diſpoſed as that their joints

Maſonry.

joints go obliquely; and their diagonals are the one perpendicular and the other level. This is the moſt agreeable maſonry to the eye, but it is very apt to crack.

Bound maſonry, is that in which the ſtones were placed one over another, like tiles; the joints of their beds being level, and the mounters perpendicular, ſo that the joint that mounts and ſeparates two ſtones always falls directly over the middle of the ſtone below. This is leſs beautiful than the net work; but it is more ſolid and durable.

Greek maſonry, according to Vitruvius, is that where after we have laid two ſtones, each of which makes a courſe, another is laid at the end, which makes two courſes, and the ſame order is obſerved throughout the building; this may be called *double binding*, in regard the binding is not only of ſtones of the ſame courſe with one another, but likewiſe of one courſe with another courſe.

Maſonry by equal courſes, called by the ancients *iſodomum*, differs in nothing from the bound maſonry, but only in this, that its ſtones are not hewn.

Maſonry by unequal courſes, called *pſeudiſodomum*, is alſo made of unhewed ſtones, and laid in bound work; but then they are not of the ſame thickneſs, nor is there any equality obſerved excepting in the ſeveral courſes, the courſes themſelves being unequal to each other.

Maſonry filled up in the middle, is likewiſe made of unhewed ſtones, and by courſes: but the ſtones are only ſet in order as to the courſes.

Compound maſonry is of Vitruvius's propoſing, ſo called as being formed of all the reſt. In this the courſes are of hewed ſtone; and the middle being left void, is filled up with mortar and pebbles thrown in together: after this the ſtones of one courſe are bound to thoſe of another courſe with iron cramps faſtened with melted lead.

All the kinds of maſonry now in uſe may be reduced to theſe five, viz. bound maſonry; that of brick work, where the bodies and projectures of the ſtones encloſe ſquare ſpaces or pannels, &c. ſet with bricks; that de moilon, or ſmall work, where the courſes are equal, well ſquared, and their edges or beds ruſticated; that where the courſes are unequal; and that filled up in the middle with little ſtones and mortar.

Free Masonry, denotes the rules or ſyſtem of myſteries and ſecrets peculiar to the ſociety of free and accepted maſons.

of para- pro-

1. When men are in a ſtate of barbarity, and are ſcattered over the ſurface of a country in ſmall and independent tribes, their wants are as ſmall in magnitude, as they are few in number. It is in the power, therefore, of every individual, to perform, for himſelf and his family, every work of labour which neceſſity or comfort requires; and while, at one time, he equips himſelf for the chaſe or the combat, at another, he is rearing a habitation for his offspring, or hollowing his canoe to ſurmount the dangers of the ſea. But as ſoon as theſe tribes aſſociate together, for the purpoſes of mutual protection and comfort, civilization advances apace; and, in the ſame proportion, the wants and deſires of the community increaſe. In order to gratify theſe, the ingenuity of individuals is called forth; and thoſe, who, from inability or indolence, cannot ſatiſfy their own wants, will immediately reſort to the ſuperior ſkill of their neighbours. Thoſe members of the community, who can execute their work with the greateſt elegance and celerity, will be moſt frequently employed; and, from this circumſtance, combined with the principle of emulation, and other cauſes, that diſtinction of profeſſions will ariſe, which is found only among nations conſiderably advanced in civilization and refinement.

Reaſons why architecture was the firſt ſeparate profeſſion.

2. One of the firſt objects of man, in a rude ſtate, is to ſcreen himſelf and his family from the heat of the tropic ſun, from the inclemency of the polar regions, or from the ſudden changes of more temperate climates. If he has arrived at ſuch a degree of improvement, as to be content to live under the dominion of a ſuperior, and under the influence of religious belief, the palace of his king, and the temple of his gods, will be reared in the moſt magnificent ſtile which his ſkill can deviſe and his induſtry accompliſh, and decked with thoſe falſe ornaments which naturally catch the eye of unpoliſhed men. From that principle which impels the lower orders to imitate the magnificence and ſplendour of of their ſuperiors, a foundation will be laid for improvement in the art of building; and it is extremely probable, from the circumſtances which have been mentioned, as well as from others which the ſlighteſt reflection will ſuggeſt, that architecture will be the firſt profeſſion to which men will excluſively devote their attention, and for which they will be trained by an eſtabliſhed courſe of preparatory education.

Architecture ſuperior to every other mechanical profeſſion.

3. Nor is it from this ground only, that maſonry derives its ſuperiority as a ſeparate profeſſion. While many other arts adminiſter to our luxury and pride, and gratify only thoſe temporary wants and unnatural deſires which refinement has rendered neceſſary, the art of building can lay claim to a higher object. The undertakings of the architect, not only furniſh us with elegant and comfortable accommodation from the inclemency of the ſeaſons, from the rapacity of wild beaſts, and the ſtill more dangerous rapacity of man; they contribute alſo to the ornament and glory of nations, and it is to them that we are indebted for thoſe fortreſſes of ſtrength which defend us from the inroads of ſurrounding enemies. Nor can the works of the architect be ranked among thoſe objects which furniſh amuſement and accommodation for a few years, or at moſt during the ſhort term of human life; they deſcend unimpaired from generation to generation; they acquire additional grandeur and value from an increaſe of age; and are the only ſpecimens of human labour which, in ſome meaſure, ſurvive the revolutions of kingdoms, and the waſte of time. The ſplendid remains of Egyptian, Grecian, and Roman architecture, which, in every age, have attracted the attention of the learned, and excited the aſtoniſhment of the vulgar, are ſtanding monuments of the ingenuity and power of man; and, in ages yet to come, they will reflect a dignity on the art of building, to which no other profeſſion can arrogate the ſlighteſt claim.

Other reaſons for the pre-eminence of architecture.

4. But there is ſtill another conſideration, which entitles architecture to a decided pre-eminence among the other arts. It is itſelf the parent of many ſeparate profeſſions; and requires a combination of talents, and an extent of knowledge, for which other profeſſions have not the ſmalleſt occaſion. An acquaintance with the

ſciences of geometry and mechanical philoſophy, with the arts of ſculpture and deſign, and other abſtruſe and elegant branches of knowledge, are indiſpenſible requiſites in the education of a good architect; and raiſe his art to a vaſt height above thoſe profeſſions, which practice alone can render familiar, and which conſiſt in the mere exertion of muſcular force. It appears, then, from theſe conſiderations, that there is ſome foundation, in the very nature of architecture, for thoſe extraordinary privileges to which maſons have always laid claim, and which they have almoſt always poſſeſſed—privileges, which no other artiſts could have confidence to aſk, or liberty to enjoy; and there appears to be ſome foundation for that ancient and reſpectable order of free maſons, whoſe hiſtory we are now to inveſtigate.

5. But, that we may be enabled to diſcover free maſonry under thoſe various forms, which it has aſſumed in different countries, and at different times, before it received the name which it now bears, it will be neceſſary to give a ſhort deſcription of the nature of this inſtitution, without developing thoſe myſteries, or revealing thoſe ceremonial obſervances which are known only to the brethren of the order.

Definition of the inſtitution of free maſonry.

6. Free maſonry is an ancient and reſpectable inſtitution, embracing individuals of every nation, of every religion, and of every condition in life. In order to confirm this inſtitution, and attain the ends for which it was originally formed, every candidate comes under a ſolemn engagement never to divulge the myſteries of the order, nor communicate to the uninitiated the ſecrets with which he may be entruſted, and the proceedings and plans in which the fraternity may be engaged. After the candidate has undergone the neceſſary ceremonies, and received the uſual inſtructions, appropriate words and ſignificant ſigns are imparted to him, that he may be enabled to diſtinguiſh his brethren of the order from the uninitiated vulgar, and convince others that he is entitled to the privileges of a brother, ſhould he be viſited by diſtreſs or want, in a diſtant land. If the newly admitted member be found qualified for a higher degree, he is promoted, after due intervals of probation, till he has received that maſonic knowledge, which enables him to hold the higheſt offices of truſt to which the fraternity can raiſe its members. At regular and appointed ſeaſons, convivial meetings of the fraternity are held in lodges conſtructed for this purpoſe: temperance, harmony, and joy, characteriſe theſe mixed aſſemblies. All diſtinctions of rank ſeem to be laid aſide, all differences in religious and political ſentiments are forgotten: and thoſe petty quarrels which diſturb the quiet of private life, ceaſe to agitate the mind. Every one ſtrives to give happineſs to his brother; and men ſeem to recollect, for once, that they are ſprung from the ſame origin, that they are poſſeſſed of the ſame nature, and are deſtined for the ſame end.

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7. Such are the prominent features of an inſtitution, which has of late produced ſo great diviſion in the ſentiments of the learned, reſpecting its origin and tendency. While a certain claſs of men (A), a little over-anxious for the dignity of their order, have repreſented it as coeval with the world; others, influenced by an oppoſite motive, have maintained it to be the invention of Engliſh Jeſuits, to promote the views of that intriguing and dangerous aſſociation (B). Some philoſophers, among whom we may reckon the celebrated Chevalier Ramſay, have laboured to prove, that free maſonry aroſe during the cruſades; that it was a ſecondary order of chivalry; that its forms originated from that warlike inſtitution, and were adapted to the peaceful habits of ſcientific men (C). Mr Clinch (D) has attempted, with conſiderable ingenuity and learning, to deduce its origin from the inſtitution of Pythagoras. M. Barruel (E) ſuppoſes it to be a continuation of the ſociety of knights templars; while others, with a degree of audacity and malice rarely to be found in the character of ingenuous men, have imputed the origin of free maſonry to ſecret aſſociations, averſe to the intereſts of true government, and purſuing the villanous and chimerical project of levelling the diſtinctions of ſociety, and freeing the human mind from the ſacred obligations of religion and morality.

Free m ry has ed und differe forms i ferent tries.

8. Without adopting any of theſe untenable opinions, or attempting to diſcover the preciſe period when free maſonry aroſe, it may be ſufficient to eſtabliſh its claim to an early origin, and to ſhew that it has exiſted in different ages of the world under different forms and appellations (F). In the execution of this taſk, the candid enquirer will be ſatisfied with ſtrong and numerous reſemblances, as the nature of the ſubject excludes the poſſibility of rigid demonſtration. Every human inſtitution is ſubject to great and numerous variations; the different aſpects under which they appear, and the principles by which they are regulated, depend upon the progreſs of civilization, upon the nature of the government by which they are protected, and on the peculiar opinions and habits of their members. If, therefore, in comparing free maſonry with other ancient aſſociations, we ſhould find it coincide with them in every circumſtance, there would be ſtrong reaſons for ſuſpecting, that the imagination of the writer had counterfeited reſemblances when deſtitute of authentic information; or that the order had adopted the rites and ceremonies of antiquity, to cloak the recency of their origin,

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(A) Anderſon's Hiſtory and Conſtitutions of Free Maſonry, p. 1. Preſton's Illuſtrations of Maſonry, p. 6. tenth edition.

(B) Manuſcript of Bode of Germany, in the poſſeſſion of M. Mounier.

(C) Leyden's Preliminary Diſſertation to the Complaynt of Scotland, p. 67, 71.

(D) Anthologia Hibernica, for January, March, April, and June 1794.

(E) Memoirs of Jacobiniſm, vol. ii. p. 377, 378, &c.

(F) M. Mounier obſerves, that if the order of free maſons exiſted among the ancients, it would have been mentioned by cotemporary authors. This argument, however, for the recency of their origin, is far from being concluſive. For though it is allowed by all, that free maſonry has exiſted in this country for at leaſt 300 years, yet the aſſociation is never *once* mentioned in any of the hiſtories of England.

origin, to command the veneration and excite the notice of the public. Againſt free maſonry, however, this charge cannot be preferred: we ſhall have occaſion to conſider it when connected with the idolatry of the heathens, when devoted to the church of Rome, and when flouriſhing under the milder influence of the reformed religion.

…ſons …y the … … … confined a few.

9. As men, in the early ages of ſociety, were deſtitute of thoſe methods of diffuſing knowledge which we now enjoy, and even of thoſe which were uſed in Greece and Rome, when the art of printing was unknown; the few diſcoveries in art and ſcience which were then made, muſt have been confined to a ſmall number of individuals. In theſe ages, the purſuit of ſcience muſt have been a ſecondary conſideration, and thoſe who did venture to explore the untrodden regions of knowledge, would overlook thoſe unſubſtantial ſpeculations, which merely gratify the curioſity of philoſophers; and would fix their attention on thoſe only which terminate in public utility, and adminiſter to the neceſſities of life. As architecture could only be preceded by agriculture, it muſt have been in this ſcience that the firſt efforts of human ſkill were tried; and in which man muſt have firſt experienced ſucceſs in extending his dominion over the works of nature. The firſt architects, therefore, would be philoſophers. They alone required the aſſiſtance of art; and they alone would endeavour to obtain it. The information which was acquired individually, would be imparted to others of the ſame profeſſion; and an aſſociation would be formed for the mutual communication of knowledge, and the mutual improvement of its members. In order to preſerve among themſelves that information which they alone collected; in order to excite amongſt others a higher degree of reſpect for their profeſſion, and prevent the intruſion of thoſe who were ignorant of architecture, and, conſequently, could not promote the object of the inſtitution, appropriate words and ſigns would be communicated to its members; and ſignificant ceremonies would be performed at their initiation, that their engagement to ſecrecy might be impreſſed upon their minds, and greater regard excited for the information they were to receive. Nor is this mere ſpeculation; there exiſt at this day, in the deſerts of Egypt, ſuch monuments of architecture, as muſt have been reared in thoſe early ages which precede the records of authentic hiſtory; and the erection of theſe ſtupendous fabrics, muſt have required an acquaintance with the mechanical arts, which is not in the poſſeſſion of modern architects. It is an undoubted fact, alſo, that there exiſted, in theſe days, a particular aſſociation of men, to whom ſcientific knowledge was confined, and who reſembled the ſociety of free maſons in every thing but the name.

…auſes of …e union …eligions te- with …e myſte- …s of free …aſonry.

10. In Egypt, and thoſe countries of Aſia which lie contiguous to that favoured kingdom, the arts and ſciences were cultivated with ſucceſs, while other nations were involved in ignorance: it is here, therefore, that free maſonry would flouriſh, and here only can we diſcover marks of its exiſtence in the remoteſt ages. It is extremely probable, that the firſt and the only object of the ſociety of maſons, was the mutual communication of knowledge connected with their profeſſion; and that thoſe only would gain admittance into their order, whoſe labours were ſubſidiary to thoſe of the architect. But when the ambition or vanity of the Egyptian prieſts prompted them to erect huge and expenſive fabrics, for celebrating the worſhip of their gods, or perpetuating the memory of their kings, they would naturally deſire to participate in that ſcientific knowledge, which was poſſeſſed by the architects they employed; and as the ſacerdotal order ſeldom fail, among a ſuperſtitious people, to gain the objects of their ambition, they would, in this caſe, ſucceed in their attempts, and be initiated into the myſteries, as well as inſtructed in the ſcience of free maſons. Theſe remarks will not only aſſiſt us in diſcovering the ſource from which the Egyptian prieſts derived that knowledge for which they have been ſo highly celebrated; they will aid us alſo in accounting for thoſe changes which were ſuperinduced on the forms of free maſonry, and for the admiſſion of men into the order, whoſe profeſſions had no connection with the royal art.

11. When the Egyptian prieſts had, in this manner, procured admiſſion into the ſociety of free maſons, they connected the mythology of their country, and their metaphyſical ſpeculations, concerning the nature of God and the condition of man, with an aſſociation formed for the excluſive purpoſe of ſcientific improvement, and produced that combination of ſcience and theology which, in after ages, formed ſuch a conſpicuous part of the principles of free maſonry.

12. The knowledge of the Egyptians was carefully concealed from the vulgar; and when the prieſts did condeſcend to communicate it to the learned men of other nations, it was conferred in ſymbols and hieroglyphics, accompanied with particular rites and ceremonies, marking the value of the gift they beſtowed. What thoſe ceremonies were, which were performed at initiation into the Egyptian myſteries, we are unable, at this diſtance of time, to determine. But as the Eleuſinian and other myſteries had their origin in Egypt, we may be able, perhaps, to diſcover the qualities of the fountain, by examining the nature of the ſtream.

The ſcience and myſteries of the Egyptians carried into Greece.

13. The immenſe population of Egypt, conjoined with other cauſes, occaſioned frequent emigrations from that enlightened country. In this manner it became the centre of civilization, and introduced into the moſt diſtant and ſavage climes the ſublime myſteries of its religion, and thoſe inventions and diſcoveries which originated in the ingenuity of its inhabitants. The firſt colony of the Egyptians that arrived in Greece, was conducted by Inachus, about 1970 years before the Chriſtian era; and about three centuries afterwards, he was followed by Cecrops, Cadmus, and Danaus (G). The ſavage inhabitants of Greece beheld with aſtoniſhment the magical tricks of the Egyptians; and regarded as gods thoſe ſkilful adventurers, who communicated to

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(G) Voyage du Jeune Anacharſis en Grece, 4to. tom. i. p. 2. Cecrops arrived in Attica in 1657 B. C. Cadmus came from Phenicia to Bœotia in 1593 B. C. and Danaus to Argolis in 1586 B. C.

Masonry.

to them the arts and sciences of their native land (H). In this manner were sown these seeds of improvement, which, in future ages, exalted Greece to ſuch pre-eminence among the nations.

Inſtitution of the Eleuſinian myſteries.

14. After the Egyptian colonies had obtained a ſecure ſettlement in their new territories, and were freed from thoſe uneaſy apprehenſions which generally trouble the invaders of a foreign land; they inſtituted, after the manner of their anceſtors, particular feſtivals or myſteries, in honour of thoſe who had benefited their country by arts or by arms. In the reign of Erichthonius, (A. C. 1500), the myſteries of the Egyptian Iſis were eſtabliſhed at Eleuſis under the name of the Eleuſinia. They were inſtituted in honour of Ceres, who having come to Greece in queſt of her daughter Proſerpine, reſided with Triptolemus at Eleuſis, and inſtructed him in the knowledge of agriculture, and in the ſtill more important knowledge of a future ſtate (I).

Inſtitution of the Panathenea and Dionyſian myſteries. Reſemblance between the Eleuſinian and Dionyſian myſteries.

15. About the ſame time, the Panathenea were inſtituted in honour of Minerva, and the Dionyſian myſteries in honour of Bacchus, who invented theatres (K), and inſtructed the Greeks in many uſeful arts, but particularly in the culture of the vine (L). That the Eleuſinian and Dionyſian myſteries were intimately connected with the progreſs of the arts and ſciences, is manifeſt from the very end for which they were formed; and that they were modelled upon the myſteries of Iſis and Oſiris, celebrated in Egypt, is probable from the ſimilarity of their origin, as well as from the conſent of ancient authors (M). If there be any plauſibility in our former reaſoning concerning the origin of knowledge in Egypt, it will follow, that the Dionyſia and the myſteries of Eleuſis, were, like the ſocieties of free maſons, formed for ſcientific improvement, though tinctured with the doctrines of the Egyptian mythology.

Similarity between the Eleuſinian myſteries and free maſonry.

16. But it is not from conjecture only that this concluſion may be drawn. The ſtriking ſimilarity among the external forms of theſe ſecret aſſociations, and the ſtill more ſtriking ſimilarity of the objects they had in view, are ſtrong proofs, that they were only different ſtreams iſſuing from a common fountain. Thoſe who were initiated into the Eleuſinian myſteries, were bound by the moſt awful engagements, to conceal the inſtructions they received, and the ceremonies that were performed (N). None were admitted as candidates, till they arrived at a certain age; and particular perſons were appointed, to examine and prepare them for the rites of initiation (O). Thoſe, whoſe conduct was found irregular, or who had been guilty of atrocious crimes, were rejected as unworthy of initiation; while the ſucceſsful candidates were inſtructed, by ſignificant ſymbols, in the principles of religion (P), were exhorted to quell every turbulent appetite and paſſion (Q), and to merit, by the improvement of their minds, and the purity of their hearts, thoſe ineffable benefits which they were ſtill to receive (R). Significant words were communicated to the members: grand officers preſided over their aſſemblies (S): Their emblems were exactly ſimilar to thoſe of free maſonry (T); and the candidate advanced from one degree to another, till he received all the leſſons of wiſdom and of virtue which the prieſts could impart (U). But beſides theſe circumſtances of reſemblance, there are two facts, tranſmitted to us by ancient authors, which have an aſtoniſhing ſimilarity to the ceremonies of the third degree of free maſonry. So ſtriking is the reſemblance, that every brother of the order who is acquainted with them, cannot queſtion, for a moment, the opinion which we have been attempting to ſupport (X).

The myſte ries of Eleuſis an of free ma ſonry have experienced the ſame treatment from the uninitiated.

17. Having thus mentioned ſome features of reſemblance between the myſteries of Eleuſis, and thoſe of free maſonry; let us now attend to the ſentiments of contemporaries, reſpecting theſe ſecret aſſociations; and we will find, that they have been treated with the ſame illiberality and inſolence. That ſome men, who, from ſelf-ſufficiency, or unſocial diſpoſitions, have refuſed to be admitted into theſe orders, ſhould detract from the character of an aſſociation, which pretends to enlighten the learned, and expand the affections of narrow and contracted minds, is by no means a matter of ſurpriſe; and it is equally conſiſtent with human nature, that thoſe, whoſe irregular conduct had excluded them from initiation, ſhould calumniate an order, whoſe bleſſings they were not allowed to participate, and whoſe honours they

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(H) Herodot. lib. i. cap. 58.

(I) Iſocrates Paneg. tom. i. p. 132.

(K) Polydor Virg. de Rerum Invent. lib. iii. cap. 13.

(L) Robertſon's Greece, p. 59. Bacchus or Dionyſius came into Greece during the reign of Amphyctyon, who flouriſhed about 1497 B. C.

(M) En adſum natura parens tuis Luci admota precibus ſumma numinum,—cujus numen unicum, multiformi ſpecie, ritu vario, totus veneratur orbis. Me primogenii Phryges Peſſinunticam nominant deûm matrem; hinc Autochtones Attici Cecropiam Minervam (alluding to the Panathenea); Illinc Cretes Dictynnam Dianam, &c. Eleuſinii vetuſtam Deam Cererem; priſcaque doctrina pollentes Egyptii, ceremoniis me prorſus propriis percolentes, appellant vero nomine reginam Iſidem. L. Apuleii Metamorph. lib. xi.

(N) Andoc. de Myſt. p. 7. Meurſius in Eleuſ. Myſt. cap. 20. This latter author has collected all the paſſages in ancient writers, about the Eleuſinian myſteries.

(O) Heſychius in Υδραν.

(P) Clemens. Alexand. Strom. lib. i. p. 325. lib. vii. p. 845.

(Q) Porphyr. ap. Stob. Eclog. Phyſ. p. 142.

(R) Arrian in Epictet. lib. iii. cap. 21. p. 440.

(S) Robertſon's Greece, p. 127.

(T) Euſeb. Prepar. Evangel. lib. iii. cap. 12. p. 117.

(U) Petav. ad. Themiſt. p. 414. Anacharſis. tom. iii. p. 582.

(X) The brethren of the order may conſult, for this purpoſe, the article ELEUSINIA, and Robertſon's hiſtory of Ancient Greece, p. 127.

they were required to keep. Men of [illegible] [illegible] [illegible] [illegible] of the Eleusinian mysteries, a[illegible] [illegible] [illegible] and [illegible]; and reproached the members of the association, that they were not more virtuous and more holy than themselves (Y). But it is the opinion of contemporary writers, that theſe rumours were completely unfounded, and aroſe from the ſilence of the initiated, and the ignorance of the vulgar. They even maintain, that the mysteries of Eleuſis produced ſanctity of manners, attention to the ſocial duties, and a deſire to be as diſtinguiſhed by virtue, as by ſilence. See **ELEUSINIA**. The illuſtrious Socrates could never be prevailed upon to partake of theſe myſteries (Z); and Diogenes, upon receiving a ſimilar ſolicitation, replied, "That Patæcion, a notorious robber, obtained initiation; and that Epaminondas and Ageſilaus never deſired it (A)." But did not theſe men know, that in all human ſocieties, the virtuous and the noble muſt ſometimes aſſociate with the worthleſs and the mean? Did they not know that there often kneel in the ſame temple, the righteous and the profane; and that the ſaint and the ſinner frequently officiate at the ſame altar? Thus did the philoſophers of antiquity calumniate and deſpiſe the myſteries of Eleuſis; and, in the ſame manner, have ſome philoſophers of our own day, defamed the character, and queſtioned the motives of free maſons.

ection ſwered.

18. This ſimilarity of treatment, which the myſteries of Ceres and free maſonry have received, is no ſmall proof of the ſimilarity of their origin, and their object. To this concluſion, however, it may be objected, that though the points of reſemblance between theſe ſecret ſocieties are numerous, yet there were circumſtances in the celebration of the Eleuſinian myſteries, which have no counterpart in the ceremonies of free maſonry. The ſacrifices, purifications, hymns, and dances, which were neceſſary in the feſtival of Ceres, have, indeed, no place in the ſociety of free maſons. But theſe points of diſſimilarity, inſtead of weakening, rather ſtrengthen our opinion. It cannot be expected, that in the reign of Polytheiſm, juſt ſentiments of the deity ſhould be entertained; and much leſs, that the adherents of Chriſtianity ſhould bend their knees to the gods of the heathens. The ancients worſhipped thoſe beings, who conferred on them the moſt ſignal benefits, with ſacrifices, purifications, and other tokens of their [illegible] [illegible] and gratitude. But when revelation had [illegible] [illegible] to man more amiable ſentiments concerning the Divine Being, the ſociety of free maſons baniſhed from their myſteries thoſe uſeleſs rites, with which the ancient brethren of the order attempted to appeaſe and requite their deities; and modelled their ceremonies upon this foundation, that there is but one God, who muſt be worſhipped in ſpirit and in truth.

19. The myſteries of Ceres were not confined to the city of Eleuſis; they were introduced into Athens about 1350 B. C. (B); and, with a few ſlight variations, were obſerved in Phrygia, Cyprus, Crete, and Sicily (C). They had reached even to the capital of France (D); and it is highly probable that, in a ſhort time after, they were introduced into Britain, and other northern kingdoms (E). In the reign of the emperor Adrian (F), they were carried into Rome, and were celebrated, in that metropolis, with the ſame rites and ceremonies which were performed in the humble village of Eleuſis. They had contracted impurities, however, from the length of their duration, and the corruption of their abettors; and though the forms of initiation were ſtill ſymbolical of the original and noble objects of the inſtitution; yet the licentious Romans miſtook the ſhadow for the ſubſtance; and, while they underwent the rites of the Eleuſinian myſteries, they were ſtrangers to the object for which they were framed.

ries of [illegible] were celebrated in ſeveral [illegible]

20. About the beginning of the fifth century, Theodoſius the Great prohibited, and almoſt totally extinguiſhed the Pagan theology in the Roman empire (G); and the myſteries of Eleuſis ſuffered in the general devaſtation (H). It is probable, however, that theſe myſteries were ſecretly celebrated, in ſpite of the ſevere edicts of Theodoſius; and that they were partly continued during the dark ages, though ſtripped of their original purity and ſplendour. We are certain, at leaſt, that many rites of the Pagan religion were performed, under the diſſembled name of convivial meetings, long after the publication of the emperor's edicts (I): and Pſellus (K), informs us, that the myſteries of Ceres ſubſiſted in Athens till the eighth century of the Chriſtian era, and were never totally ſuppreſſed.

Abolition of the Eleuſinian myſteries [illegible]

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21. Having

(Y) Robertſon's Greece, p. 127. Porphyr. de Abſtinentia, lib. iv. p. 353. Julian orat. v. p. 173.

(Z) Lucian in Demonact. tom. ii. p. 380.

(A) Plut. de aud. Poet. tom. ii. p. 21. Diog. Laert. lib. vi. § 39.

(B) Playfair's Chronology.

(C) Lucii Apuleii Metamorph. lib. xi. p. 197, 198.

(D) Praiſe of Paris, or a ſketch of the French capital, 1803, by S. Weſt, F. R. S. F. A. S. This author obſerves, in the preface to his work, that Paris is derived from *Par Iſis*, becauſe it was built beſide a temple, dedicated to that goddeſs; that this temple was demoliſhed at the eſtabliſhment of Chriſtianity, and that there remains, to this day, in the Petits Auguſtins, a ſtatue of Iſis nurſing Orus.

(E) Omitto Eleuſinem ſanctam illam et auguſtam, *ubi initiantur gentes orarum ultimæ*. Cic. de Nat. Deorum, lib. i. ſub fine.

(F) A. D. 117. Encyclop. Brit. vol. vi. p. 555. Potter's Antiq. vol. i. p. 389.

(G) Gibbon's Hiſtory of the Decline and Fall of the Roman Empire, 8vo. vol. v. p. 120.

(H) Zozim. Hiſt. lib. iv.

(I) Gibbon, vol. v. p. 110.

(K) In his treatiſe [illegible], quoted by Mr Clinch in the Anthologia Hibernica, for January 1794, p. 36.

Maſonry.

21. Having thus conſidered the origin and decline of the myſteries of Eleuſis, and diſcovered in them numerous and prominent features of reſemblance to thoſe of free maſonry; we may reaſonably infer, that the Egyptian myſteries which gave riſe to the former, had a ſtill nearer affinity to the latter; and, from this concluſion, the opinions that were formerly ſtated, concerning the antiquity of the order, and the origin of Egyptian knowledge, will receive very conſiderable confirmation.

Origin and hiſtory of the Dionyſian myſteries.

22. Let us now direct our attention to the Dionyſia, or myſteries of Bacchus, which were intimately connected with thoſe of Ceres, and, perhaps, ſtill more with the myſteries of free maſonry. Herodotus (L) informs us that the ſolemnities, in honour of Dionyſius or Bacchus, were originally inſtituted in Egypt; and were tranſported from that country into Greece, by one Melampus. But not only did the myſteries of Ceres and Bacchus flow from the ſame ſource; the one was in ſome meaſure interwoven with the other, and it is almoſt certain, from what we are now to mention, that thoſe who were initiated into the former, were entitled to be preſent at the celebration of the latter. The ſixth day of the Eleuſinian feſtival was the moſt brilliant of the whole. It received the appellation of Bacchus, becauſe it was chiefly, if not excluſively, devoted to the worſhip of that god. His ſtatue, attended by the initiated and the miniſters of the temple, was conducted from Athens to Eleuſis, with much pomp and ſolemnity (M). And after it had been introduced into the temple of Ceres, it was brought back to Athens with ſimilar ceremonies. The connection between the Eleuſinian and Dionyſian myſteries is manifeſt, alſo, from the common opinion, that Ceres was the mother of Bacchus (N). And Plutarch aſſures us, that the Egyptian Iſis was the prototype of Ceres; that Oſiris was the ſame with Bacchus; and that the Dionyſia of Greece was only another name for the Pamylia of Egypt (O). As Bacchus was the inventor of theatres, as well as of dramatical repreſentations, that particular claſs of maſons, who were employed in the erection of theſe extenſive buildings, were called the Dionyſian artificers (P), and were initiated into the myſteries of their founder, and conſequently into thoſe of Eleuſis (Q). But, from the tendency of the human mind to embrace the ceremonial, while it neglects the ſubſtantial part of an inſtitution, the Dionyſian feſtival, in the degenerate ages of Greece, was more remarkable for inebriation and licentiouſneſs, than for the cultivation of virtue and of ſcience; and he who was at firſt celebrated as the inventor of arts, was afterwards worſhipped as the god of wine. Thoſe who were deſirous of indulging ſecretly in licentious mirth and unhallowed feſtivity, cloaked their proceedings under the pretence of worſhipping Bacchus; and brought diſgrace upon thoſe myſteries, which were inſtituted for the promotion of virtue, and the improvement of art.

Maſonry.

The Bacchanalia unconnected with the Dionyſian myſteries.

23. About 200 years B. C. an illiterate and licentious prieſt came from Greece to Tuſcany, and inſtituted the Bacchanalia, or feaſt of the Bacchanals (R). From Tuſcany they were imported to Rome; but the promoters of theſe midnight orgies having proceeded to the fartheſt extremity of diſſipation and diſloyalty, they were aboliſhed throughout all Italy, by a decree of the ſenate (S). It has been fooliſhly ſuppoſed, that the Bacchanalia were ſimilar to the Dionyſian myſteries, merely becauſe they were both dedicated to Bacchus. The Liberalia of Rome was the feſtival correſponding to the Dionyſia of Greece (T); and it is probable that this feaſt was obſerved throughout the Roman empire, till the abrogation of the Pagan theology in the reign of Theodoſius. The opinion which an impartial inquirer would form, concerning the nature and tendency of the myſteries of Bacchus, would not be very favourable to the character of the inſtitution. But it ſhould be remembered that deviations from the intentions and form of any aſſociation, are no objection to the aſſociation itſelf. They are rather proofs of its original purity and excellence; as it is not from the paths of vice, but from thoſe of virtue, that we are accuſtomed to ſtray.

The Liberalia were ſimilar to the Dionyſian myſteries.

24. Hitherto we have conſidered the Dionyſian myſteries under an unpropitious aſpect; let us now trace them in their progreſs from Europe to Aſia, where they retained their primitive luſtre, and effectually contributed to the rapid advancement of the fine arts.

In conſequence of the Ionic migration the Dionyſian myſteries were eſtabliſhed in Aſia.

25. About 1000 years B. C. (U), the inhabitants of Attica, complaining of the narrowneſs of their territory, and the unfruitfulneſs of its ſoil, went in queſt of more extenſive and fertile ſettlements. Being joined by a number of the inhabitants of ſurrounding provinces, they ſailed to Aſia Minor, drove out the inhabitants, ſeized upon the moſt eligible ſituations, and united them under the name of Ionia, becauſe the greateſt number of the refugees were natives of that Grecian province (X). As the Greeks, prior to the Ionic migration,

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(L) Ελλησι γαρ δη Μελαμπȣς, εστι ο εξηγησαμενος τȣ Διονυσȣ το τε ȣνομα και την θυσιην. Herodot. lib. ii. cap. 49.

(M) Anacharſis, tom. iii. p. 531. Plut. in Phoc. tom. i. p. 754. Meurſ. in Eleuſ. cap. 27.

(N) Potter, vol. i. p. 393.

(O) De Iſide et Oſiride. Idèe du Gouvernment Ancien et Modern de l'Egypte, p. 26. Paris 1743.

(P) Διονυσιακοι τεχνιται. Aulus Gellius, lib. xx. c. 4.

(Q) Vid. Potter, vol. i. p. 41.

(R) Tit. Liv. lib. xxxix. cap. 8.

(S) Græcus ignobilis in Etruriam venit, *nulla cum arte earum quas multas ad animorum corporumque cultum nobis eruditiſſima omnium gens invexit*, ſed ſacrificulus et vatis.

(T) Liberalia (ſays Feſtus) liberi Feſta, quæ apud Græcos dicuntur Dionyſia. Vid. Univerſal Hiſtory, vol. xiii. p. 262.

(U) Playfair places the Ionic migration in 1044 B. C. Gillies in 1055; and Barthelemy, the author of Anacharſis's Travels, in 1076.

(X) Herodotus, lib. i. cap. 142. Gillies's Hiſt. of Greece, 8vo. vol. i. p. 102.

gration, had made conſiderable progreſs in the arts and ſciences (Y), they carried theſe along with them into their new territories; and introduced into Ionia the myſteries of Minerva and Dionyſius (Z), before they were corrupted by the licentiouſneſs of the Athenians. In a ſhort time the Aſiatic colonies ſurpaſſed the mother-country in proſperity and ſcience. Sculpture in marble, and the Doric and Ionian orders, were the reſult of their ingenuity (A). They returned even into Greece; they communicated to their anceſtors the inventions of their own country; and inſtructed them in that ſtyle of architecture which has been the admiration of ſucceeding ages. For theſe improvements the world is indebted to the *Dionyſian artificers*, an aſſociation of ſcientific men, who poſſeſſed the excluſive privilege of erecting temples, theatres, and other public buildings in Aſia Minor (B). They ſupplied Ionia, and the ſurrounding countries, as far as the Helleſpont, with theatrical apparatus by contract; and erected the magnificent temple at Teos, to Bacchus, the founder of their order (C). Theſe artiſts were very numerous in Aſia, and exiſted, under the ſame appellation, in Syria, Perſia, and India (D). About 300 years before the birth of Chriſt, a conſiderable number of them were incorporated, by command of the kings of Pergamus, who aſſigned to them Teos as a ſettlement, being the city of their tutelary god (E). The members of this aſſociation, which was intimately connected with the Dionyſian myſteries, were diſtinguiſhed from the uninitiated inhabitants of Teos, by the ſcience which they poſſeſſed, and by appropriate words and ſigns, by which they could recognize their brethren of the order (F). Like free maſons they were divided into lodges, which were diſtinguiſhed by different names (G). They occaſionally held convivial meetings in houſes erected and conſecrated for this purpoſe; and each ſeparate aſſociation was under the direction of a maſter, and preſidents, or wardens (H). They held a general meeting once a year, which was ſolemnized with great pomp and feſtivity; and at which the brethren partook of a ſplendid entertainment, provided by the maſter, after they had finiſhed the ſacrifices to their gods, and eſpecially to their patron Bacchus (I). They uſed particular utenſils in their ceremonial obſervances; ſome of which were exactly ſimilar to thoſe that are employed by the fraternity of free maſons (K). And the more opulent artiſts were bound to provide for the exigencies of their poorer brethren (L). The very monuments which were reared by theſe maſons, to the memory of their maſters and wardens, remain to the preſent day, in the Turkiſh burying grounds, at Siverhiſſar and Eraki (M). The inſcriptions upon them expreſs, in ſtrong terms, the gratitude of the fraternity, for their diſintereſted exertions in behalf of the order; for their generoſity and benevolence to its individual members; for their private virtues, as well as for their public conduct. From ſome circumſtances which are ſtated in theſe inſcriptions, but particularly from the name of one of the lodges, it is highly probable, that Attalus, king of Pergamus, was a member of the Dionyſian fraternity.

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26. Such is the nature of that aſſociation of architects, who erected thoſe ſplendid edifices in Ionia, whoſe ruins even afford us inſtruction, while they excite our ſurpriſe. If it be poſſible to prove the identity of any two ſocieties, from the coincidence of their external forms, we are authoriſed to conclude, that the fraternity of the Ionian architects, and the fraternity of free maſons, are exactly the ſame; and as the former practiſed the myſteries of Bacchus and Ceres, ſeveral of which we have ſhown to be ſimilar to the myſteries of maſonry; we may ſafely affirm, that, in their internal, as well as external procedure, the ſociety of free maſons reſembles the Dionyſiacs of Aſia Minor (N).

27. The

(Y) According to the author of Anacharſis's Travels, the arts took their riſe in Greece about 1547, B. C.

(Z) Chandler's Travels in Aſia Minor, p. 100, 4to. 1775. The Panathenea and the Dionyſian myſteries were inſtituted about 300 years before the Ionic migration.

(A) Gillies's Hiſt. Ant. Greece, vol. ii. p. 162.

(B) Strabo, lib. iv. Chiſhull Antiquitates Aſiaticæ, p. 107. Robiſon's Proofs of a Conſpiracy, p. 20.

(C) Ionian Antiquities, publiſhed by the Society of Dilettanti, p. 4. Strabo, lib. iv. Chiſhull Antiq. Aſiat. p. 139.

(D) Και τω Διονυσω την Ασιαν ὁλην καθιερωσαντες μεχρι της Ινδικης. Strabo, p. 471. Ionian Antiquities, p. 4.

(E) Chandler's Travels, p. 100. Chiſhull Antiq. Aſiat. p. 138. Ionian Antiquities, p. 4.

(F) Robiſon's Proofs of a Conſpiracy, p. 20.

(G) One of theſe lodges was denominated Κοινον των Ατταλιςων, i. e. Commune Attaliſtarum; and another Κοινον της Εχινε Συμμοριας, i. e. Commune Sodalitii Echini. Chiſhull, p. 139.

(H) See the two decrees of theſe artiſts preſerved by Chiſhull, p. 138—149. The place where they aſſembled is called συνοικια, contubernium; and the ſociety itſelf, ſometimes συναγωγη, collegium; ἁιρεσις, ſecta; συνοδος, ſynodos; κοινος, communitas. See Aulus Gellius, lib. viii. cap. xi.

(I) Chandler's Travels, p. 103.

(K) See the decree of the Attaliſts in Chiſhull, particularly the paſſages at the bottom of p. 141, 142; ἀνελιπε δε και τα προς ευσχημοσυνην εν τω τεμενει χορηγια ἱκανα, i. e. in delubro etiam, ultra ea quae ornamento erant, non pauca utenſilia reliquit.

(L) Chiſhull, p. 140.

(M) Chandler's Travels, p. 100. Theſe monuments were erected about 150 years B. C. The inſcriptions upon them were publiſhed by Edmund Chiſhull, in 1728, from copies taken by Conſul Sherard in 1709, and examined in 1716. Ionian Antiquities, p. 3.

(N) Dr Robiſon, who will not be ſuſpected of partiality to free maſons, aſcribes their origin to the Dionyſian artiſts.

[illegible] ing of Solo- [illegible] probable.

27. The opinion therefore of free maſons, that their order exiſted, and flouriſhed at the building of Solomon's temple, is by no means ſo pregnant with abſurdity as ſome men would wiſh us to believe. We have already ſhown, from authentic ſources of information, that the myſteries of Ceres and Bacchus, were inſtituted about 400 years before the reign of Solomon (O); and there are ſtrong reaſons for believing, that even the aſſociation of the Dionyſian architects exiſted before the building of the temple. It was not, indeed, till about 300 years before the birth of Chriſt, that they were incorporated at Teos, under the Kings of Pergamus; but it is univerſally allowed, that they aroſe long before their ſettlement in Ionia, and, what is more to our preſent purpoſe, that they exiſted in the very land of Judea (P). It is obſerved by Dr Robiſon (Q), that this aſſociation came from Perſia into Syria, along with that ſtyle of architecture which is called Grecian: And ſince we are informed by Joſephus (R), that that ſpecies of architecture was uſed at the erection of the temple; there is reaſon to infer, not only that the Dionyſiacs exiſted before the reign of Solomon, but that they aſſiſted this monarch in building that magnificent fabric, which he reared to the God of Iſrael. Nothing, indeed, can be more ſimple and conſiſtent than the creed of the fraternity, concerning the ſtate of their order at this period. The vicinity of Jeruſalem to Egypt; the connection of Solomon with the royal family of that kingdom (S); the progreſs of the Egyptians in architectural ſcience; their attachment to myſteries and hieroglyphic ſymbols; and the probability of their being employed by the king of Iſrael, are additional conſiderations, which corroborate the ſentiments of free maſons, and abſolve them from thoſe charges of credulity and pride with which they have been loaded.

Objection anſwered.

28. To theſe opinions, it may be objected, that if the fraternity of free maſons flouriſhed during the reign of Solomon, it would have exiſted in Judea in after ages, and attracted the notice of ſacred or profane hiſtorians. Whether or not this objection is well founded, we ſhall not pretend to determine; but if it can be ſhown, that there did exiſt, after the building of the temple an aſſociation of men, reſembling free maſons, in the nature, ceremonies, and object of their inſtitution; the force of the objection will not only be taken away, but additional ſtrength will be communicated to the opinions which we have been ſupporting. The aſſociation here alluded to, is that of the Eſſenes, whoſe origin and ſentiments have occaſioned much diſcuſſion among eccleſiaſtical hiſtorians. They are all of one mind, however, reſpecting the conſtitution and obſervances of this religious order.

Hiſtory the Eſſ

29. When a candidate was propoſed for admiſſion, the ſtricteſt ſcrutiny was made into his character (T). If his life had hitherto been exemplary; and if he appeared capable of regulating his conduct according to the virtuous though auſtere maxims of their order, he was preſented, at the expiration of his noviciate, with a white garment, as an emblem of the correctneſs of his conduct and the purity of his heart (U). A ſolemn oath was then adminiſtered to him, that he would never, even at the riſk of his life, divulge the myſteries of the order: that he would make no innovations on the doctrines of the ſociety; and that he would continue in that honourable courſe of piety and virtue which he had begun to purſue (X). Like free maſons, they inſtructed the young member in the knowledge which they derived from their anceſtors (Y). They admitted no women into their order (Z). They had particular ſigns for recogniſing each other, which have a ſtrong reſemblance to thoſe of free maſons (A). They were divided into ſeparate lodges or colleges (B). They had different places of meeting, where they practiſed their rites, and ſettled the affairs of the ſociety; and, after the performance of theſe duties, they aſſembled in a large hall, where an entertainment was provided for them by the preſident, or maſter of the college, who allotted a certain quantity of proviſions to every individual (C). They aboliſhed all diſtinctions of rank; and, if preference was ever given, it was given to piety, liberality, and virtue (D). Stewards were appointed in every town, to ſupply the wants of indigent ſtrangers (E). The Eſſenes pretended to higher degrees of piety and knowledge, than the uninitiated vulgar; and though their pretenſions were high, they were never queſtioned by their enemies. Auſterity of manners was one of the chief characteriſtics of the Eſſenian fraternities:

(O) According to Playfair's Chronology, the temple of Solomon was begun in 1016, and finiſhed in 1008, B. C. The Eleuſinian myſteries were introduced into Athens in 1356 B. C. a conſiderable time after their inſtitution.

(P) Robiſon's Proofs of a Conſpiracy, p. 20.

(Q) Proofs of a Conſpiracy, p. 20, 21.

(R) Jewiſh Antiquities, book viii. chap. v.

(S) Joſephus's Jewiſh Antiquities, book viii. chap. ii.

(T) Joſeph. de Bello Judaico, lib. ii. cap. 1. (U) Id. id. (X) Id. id.

(Y) Philo de Vita Contemplativa, apud opera, p. 691. Baſnage, b. ii. ch. 13. § 8.

(Z) Baſnage, b. ii. ch. 12. § 26. Id. Id. § 22.

(A) In order to be convinced of this, our brethren of the order may conſult ſome of the works already quoted; particularly, Philo's Treatiſe de Vita Contemplativa, apud opera, p. 691.

(B) Baſnage, b. iii. c. 12. § 14. vid. opera Philonis, p. 679. When Philo, in his Treatiſe entitled "Quod omnis probus Liber," is deſcribing the ſociety of the Eſſenes, he employs the ſame terms to denote the aſſociation itſelf, and their places of meeting, which are uſed in the decree of the Dionyſians already mentioned. Vide Philo de Vita Contemplativa, p. 691.

(C) Joſeph. de Bello Judaico, lib. ii. cap. i. (D) Id. Id. § 20, 22. Philonis Opera, p. 678.

(E) Baſnage, b. iii. c. 12. § 20. chap. 13. § 1.

nry.

ties: They frequently assembled, however, in convivial parties; and relaxed for a while the severity of those duties which they were accustomed to perform (F). This remarkable coincidence between the chief features of the maſonic and Eſſenian fraternities, can be accounted for, only by referring them to the ſame origin. Were the circumſtances of reſemblance either few or fanciful, the ſimilarity might have been merely caſual. But when the nature, the object, and the external forms of two inſtitutions, are preciſely the ſame, the arguments for their identity are ſomething more than preſumptive. There is one point, however, which may, at firſt ſight, ſeem to militate againſt this ſuppoſition. The Eſſenes appear to have been in no reſpects connected with architecture, nor addicted to thoſe ſciences and purſuits which are ſubſidiary to the art of building. That the Eſſenes directed their attention to particular ſciences, which they pretended to have received from their fathers, is allowed by all writers; but, whether or not theſe ſciences were in any ſhape connected with architecture, we are, at this diſtance of time, unable to determine. Be this as it may, uncertainty upon this head, nay, even an aſſurance that the Eſſenes were unconnected with architectural ſcience, will not affect the hypotheſis which we have been maintaining. For there have been, and ſtill are, many aſſociations of free maſons, where no architects are members, and which have no connection with the art of building. But if this is not deemed a ſufficient anſwer to the objection, an inquiry into the origin of the Eſſenes will probably remove it altogether, while it affords additional evidence, for the identity of the maſonic and Eſſenian aſſociations.

Eſſenes nated the leans, were d to rve temple ruina-

30. Sacred and profane hiſtorians have entertained different opinions concerning the origin of the Eſſenes. They all agree, however, in repreſenting them as an ancient aſſociation, originating from particular fraternities, which formerly exiſted in the land of Judea (G). Pliny refers them to ſuch a remote antiquity (H), that they muſt have exiſted during the reign of Solomon; and even Baſnage, who is the only writer that ſeems diſpoſed to conſider them as a recent aſſociation, confeſſes that they exiſted under Antigonus, about 300 years before the Chriſtian era (I). Scaliger contends, with much appearance of truth, that the Eſſenes were deſcended from the Kaſideans, who make ſuch a conſpicuous figure in the hiſtory of the Maccabees (K). The Kaſideans were a religious fraternity, or an order of the Knights of the Temple [illegible] themſelves to [illegible] the [illegible] ſtructure, and to preſerve it [illegible]. This aſſociation was compoſed [illegible] Iſrael, who were diſtinguiſhed for their charitable and peaceful diſpoſitions (M); and always ſignalized themſelves by their ardent zeal for the purity and preſervation of the temple (N). From theſe facts it appears, that the Eſſenes were not only an ancient fraternity, but that they originated from an aſſociation of architects, who were connected with the building of Solomon's temple. Nor was this order confined to the Holy Land. Like the fraternities of the Dionyſiacs and free maſons, it exiſted in all parts of the world (O); and though the lodges in Judea were chiefly, if not wholly, compoſed of Jews, yet the Eſſenes admitted into their order men of every religion, and every rank in life (P). They adopted many of the Egyptian myſteries (Q); and, like the prieſts of that country, the magi of Perſia, and the gymnoſophiſts in India, they united the ſtudy of moral with that of natural philoſophy (R). Although they were patronized by Herod, and reſpected by all men for the correctneſs of their conduct, and the innocence of their order (S), they ſuffered ſevere perſecutions from the Romans, till their order was aboliſhed, about the middle of the fifth century (T); a period extremely fatal to the venerable inſtitutions of Egypt, Greece, and Rome.

Inſtitution of Pythagoras at Crotona.

31. Connected with the Eſſenian and Maſonic fraternities, was the inſtitution of Pythagoras at Crotona. After this philoſopher, in the courſe of his travels through Egypt, Syria, and Ionia, had been initiated into the myſteries of theſe enlightened kingdoms, he imported into Europe the ſciences of Aſia, and offered to the inhabitants of his native ſoil, the important benefits which he himſelf had received (U). The offers of the ſage having been rejected by his countrymen of Samos (X), he ſettled at Crotona, in Italy, where more reſpect was paid to his perſon, and more attention to his precepts (Y). When the kindneſs of the Crotonians, and their ſolicitude to obtain ſcientific information, had inſpired Pythagoras with ſome hopes of ſucceſs, he ſelected a number of his diſciples, who, from the ſimilarity of their characters, the mildneſs of their diſpoſitions, and the ſteadineſs of their conduct, ſeemed beſt adapted for forwarding the purpoſes he had in view (Z). Theſe he formed into a fraternity, or ſeparate order of men, whom

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(F) Dicam aliquid de ſodalitiis eorum, quoties hilarius convivia celebrant. Philonis opera, p. 692.

(G) Gale's Court of the Gentiles, part ii. book ii. chap. 6. p. 147. Serrarii Trihæreſ. lib. iii. cap. ii. Vid. etiam Baſnage, b. ii. ch. 12. § 4.; and Pictet. Theolog. Chret. tom. iii. part iii. p. 106.

(H) Plin. lib. v. cap. 17. Vid. etiam Solinum, c. 35. p. 43. edit. Salmaſii; and art. ESSENES.

(I) Baſnage, book ii. chap. ii. § 8. Pictet. Theolog. Chret. tom. iii. part iii. p. 107.

(K) Scaliger de Emend. Temp.

(L) Scaliger Elench. Trihæræſii Nicolai Serrarii, cap. 22. p. 441.

(M) 1 Maccabees, vii. 13.

(N) Scaliger ut ſupra.

(O) Baſnage, b. ii. chap. 13. § 4.

(P) Id. Id. chap. 12. § 20. compared with chap. 13. § 4.

(Q) Id. Id. chap. 12. § 24.

(R) Philo's Treatiſe, entitled, "Quod omnis probus Liber," apud Opera, p. 678.

(S) Id. Id. chap. 12. § 13, 25.

(T) Baſnage, b. ii. chap. 12. § 25, 26.

(U) Pythagoras returned from Egypt about 560 years before Chriſt.

(X) Iamblichus de vita Pythagoræ, part i. cap. 5. p. 37.

(Y) Id. Id. cap. 6. p. 42, 43.

(Z) Gillies's Hiſtory of Ancient Greece, vol. ii. p. 27.

whom he inſtructed in the ſciences of the eaſt (A), and to whom he imparted the myſteries and rites of the Egyptian, Syrian, and Ionian aſſociations. Before any one was received into the number of his diſciples, a minute and diligent enquiry was made into his temper and character (B). If the iſſue of this enquiry was favourable to the candidate, he bound himſelf, by a ſolemn engagement, to conceal, from the uninitiated, the myſteries which he might receive, and the ſciences in which he might be inſtructed (C). The doctrines of charity, of univerſal benevolence, and eſpecially of affection to the brethren of the order, were warmly recommended to the young diſciples (D); and ſuch was the influence which they had upon their minds, that diſcord ſeemed to have been baniſhed from Italy (E), and the golden age to have again returned. Strangers of every country, of every religion, and of every rank in life, were received, if properly qualified, into the Pythagorean aſſociation (F). Like free maſons they had particular words and ſigns, by which they might diſtinguiſh each other, and correſpond at a diſtance (G). They wore white garments, as an emblem of their innocence (H). They had a particular regard for the eaſt (I). They advanced from one degree of knowledge to another (K). They were forbidden to commit to writing their myſteries, which were preſerved ſolely by tradition (L): The Pythagorean ſymbols and ſecrets were borrowed from the Egyptians, the Orphic and Eleuſinian rites, the Magi, the Iberians, and the Celts (M). They conſiſted chiefly of arts and ſciences, united with theology and ethics, and were communicated to the initiated in cyphers and ſymbols (N). An aſſociation of this nature, founded upon ſuch principles, and fitted for ſuch ends, did not remain long in obſcurity. In a ſhort time it extended over the kingdoms of Italy and Sicily, and was diffuſed even through ancient Greece, and the iſlands of the Egean ſea (O). Like other ſecret ſocieties, it was vilified by malicious men, who were prohibited from ſharing its advantages, from the weakneſs of their minds and the depravity of their hearts (P). Chagrined with diſappointment, and enflamed with rage, they often executed vengeance upon the innocent Pythagoreans, and even ſet fire to the lodges in which they were aſſembled (Q). But the diſciples of the ſage perſiſted in that honourable cauſe in which they had embarked; and, though the perſecution of their enemies drove them from their native land, they ſtill retained for each other the ſympathy of brothers, and often ſuffered death in its moſt agonizing form, rather than violate the engagements into which they had entered (R). An attempt, like this, againſt the ſociety of free maſons, has been witneſſed in our own day. It has not, indeed, proceeded to ſuch an extremity of violence. The ſpirit of extirpation, however, exiſted in ſentiment, though it had not the courage to diſplay itſelf in action. Diſaffection to government, and diſreſpect to religion, were charged upon them with all the confidence of truth: And, had the governments of Europe been weak enough to credit the fancies of a few political enthuſiaſts, their ſubjects might, at this moment, have been armed againſt each other, and the nations of the world embroiled in diſcord.

32. From theſe obſervations, it is manifeſt, that the Pythagorean and Maſonic inſtitutions were ſimilar in their external forms, as well as in the objects which they had in view; and that both of them experienced, from contemporaries, the ſame unmerited reproach. Mr Clinch, in his Eſſays on Free Maſonry (S), has enumerated, at great length, all the points of reſemblance between theſe two inſtitutions. He attempts to prove, that free maſonry took its riſe from the Pythagorean fraternity; but though he has been ſucceſsful in pointing out a remarkable coincidence between theſe aſſociations, he has no authority for concluding that the former originated from the latter. In a maſonic manuſcript, preſerved in the Bodleian library, in the handwriting of King Henry VI. it is expreſsly ſaid, that Pythagoras learned maſonry from Egypt and Syria, and from thoſe countries where it had been planted by the Phenicians; that the Pythagoreans carried it into France; and that it was, in the courſe of time, imported from that country into England (T). This, indeed, is no direct proof of our opinion; it ſhows us, at leaſt, that the ſame ſentiments have been entertained about four hundred years ago by the fraternity in England. It has been ſuppoſed by ſome philoſophers

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(A) Aulus Gellius lib. i. cap. 9. Gillies, vol. ii. p. 27.

(B) Jamblichus de vita Pythagoræ, cap. 17. p. 76. Gillies vol. iii. p. 27.

(C) Jamblichus cap. 23. p. 104.

(D) Id. cap. 8. p. 53. cap. 33. p. 193. cap. 6. p. 43. cap. 23. p. 102. Baſnage's Hiſtory of the Jews, b. ii. cap. 13. § 21. Anthologia Hibernica for March 1794, p. 181.

(E) Jamblichus, cap. 7. p. 46.

(F) Gillies. vol. ii. p. 28. Jamblichus, cap. 33. p. 202.

(G) Gillies, vol. ii. p. 27. Anthologia Hibernica, for March 1794, p. 181.

(H) Baſnage, b. ii. chap. 13. § 21. Anthologia Hibernica for March 1794, p. 183.

(I) Baſnage, b. ii. chap. 13. § 21.

(K) Jamblichus, cap. 17. p. 72.

(L) Jamblichus, part i. cap. 32. p. 191.

(M) Warburton's Divine Legation of Moſes, book iii. ſect. 3. vol. 2. p. 132, 133. Jamblichus, cap. 8. p. 139. Gillies, vol. ii. p. 27.

(N) Jamblichus, cap. 8. p. 139. Gillies ut ſupra.

(O) Gillies, vol. ii. p. 28. Jamblichus cap. 35. p. 207.

(P) Id. Id. p. 200.

(Q) Jamblichus p. 208. et ſeq.

(R) Id. Id. chap 32. p. 189.

(S) Publiſhed in the Anthologia Hibernica for 1794.

(T) Lives of Leland, Hearne, and Wood, Oxford, 1772. Appendix to the life of Leland, N° vii. A copy of this manuſcript may be ſeen in every work on free maſonry.

Mafonry. phers (W), that Pythagoras derived his myſteries chiefly from the Eſſenes, who were at that time eſtabliſhed and very numerous in Egypt and Syria. The wonderful ſimilarity, indeed, between theſe fraternities, both in the forms which they had in common with free maſonry, and in their other cuſtoms and ceremonies, which were peculiar to themſelves, render ſuch a ſuppoſition extremely probable. It is remarked by all ecclesiaſtical hiſtorians, that the Eſſenes were Pythagoreans, both in diſcipline and doctrine (X); without ever conſidering that the former exiſted ſome hundred years before the birth of Pythagoras (Y). The Pythagoreans, therefore, were connected with the Eſſenes, and the Eſſenes with the Kaſſideans, who engaged to preſerve and adorn the temple of Jeruſalem.

Objection anſwered. 33. There is one objection to the view which we have taken of this ſubject, which, though it has already been ſlightly noticed, it may be neceſſary more completely to remove. Although it will be acknowledged by every unbiaſſed reader, that free maſonry has a wonderful reſemblance to the Eleuſinian and Dionyſian myſteries, the fraternity of Ionian architects, and the Eſſenian and Pythagorean aſſociations; yet ſome may be diſpoſed to queſtion the identity of theſe inſtitutions, becauſe they had different names, and becauſe ſome uſages were obſerved by one, which were neglected by another. But theſe circumſtances of diſſimilarity ariſe from thoſe neceſſary changes, which are ſuperinduced upon every inſtitution, by a ſpirit of innovation, by the caprice of individuals, and by the various revolutions in civilized ſociety. Every alteration or improvement in philoſophical ſyſtems, or ceremonial inſtitutions, generally produces a correſponding variation in their name, deduced from the nature of the improvement, or from the name of the innovator. The different aſſociations, for example, whoſe nature and tendency we have been conſidering, received their names from circumſtances merely caſual, and often of trifling conſideration; though all of them were eſtabliſhed for the ſame purpoſe, and derived from the ſame ſource. When the myſteries of the Eſſenes were imported by Pythagoras into Italy, without undergoing much variation, they were there denominated the myſteries of Pythagoras; and, in our own day, they are called the ſecrets of free maſonry, becauſe many of their ſymbols are derived from the art of building, and becauſe they are believed to have been invented by an aſſociation of architects, who were anxious to preſerve, among themſelves, the knowledge which they had acquired (Z). The difference in the ceremonial obſervances of theſe inſtitutions may be accounted for nearly upon the ſame principles. From the ignorance, or ſuperior ſagacity of thoſe who preſided over the ancient fraternities, ſome ceremonies would be inſiſted upon more than others, ſome of leſs moment would be omitted as of no conſequence, while others of greater importance would be diſpenſed with entirely. In proceſs of time, moreover, ſome trifling changes would be effected upon theſe ceremonies, ſome rites aboliſhed, and ſome introduced. The chief difference, however, between the ancient and modern myſteries, is, in theſe points which concern religion. But this ariſes from the great changes which have been produced in religious knowledge. It cannot be ſuppoſed that the rites of the Egyptian, Jewiſh, and Grecian religions, ſhould be obſerved by thoſe who profeſs [illegible] ſhould pour out libations to Ceres and Bacchus, who acknowledge no heavenly ſuperior, but the true and the living God.

Mafonry. [illegible] anſwered. 34. It may be [illegible] Barruel [illegible] thoſe, who believe that the myſteries of free maſonry are ſimilar to the myſteries of Egypt and Greece (A). From the unfairneſs with which this writer has ſtated the ſentiments of his opponents on this ſubject; from the confidence and triumph with which he has propoſed his own; and, above all, from the diſingenuity with which he has ſupported them, many inattentive readers may have been led to adopt his ſentiments, and to form as deſpicable an idea of the underſtandings, as he would wiſh them to form of the character of maſons. He takes it for granted, that all who embrace the opinion which we have endeavoured to [illegible] believe, that a unity of religious ſentiments, and moral principles, was maintained in all the ancient myſteries; and that the initiated entertained juſt notions of the unity of God, while the vulgar were addicted to the groſſeſt polytheiſm. Upon this gratuitous ſuppoſition, which we completely diſavow, becauſe it has no connection with our hypotheſis, does Barruel found all his declamations againſt the connection of our order with the Pythagorean and Eleuſinian inſtitutions. If this ſuppoſition, indeed, were true, his opinion would be capable of proof. But he is all the while combating the dogmas of Warburton, while he thinks he is overturning the antiquity of our order. There is perhaps in no language ſuch a piece of downright ſophiſtry as this portion of Barruel's work. He ſeems to ſcruple at no method, however baſe or diſhonourable, that can bring diſcredit upon free maſonry, and every thing connected with it. After having overturned the opinion of Warburton, he then attacks us on our ground, and ſtiles us the children of ſophiſtry, deiſm, and pantheiſm, who deduce our origin from aſſociations of men that were enemies to Chriſtianity (B), and followed no guide but the light of nature. But this writer ſhould recollect, that the ſon is not accountable for the degeneracy of his parents; and, if the ancient myſteries were the nurſeries of ſuch dangerous opinions, as this writer, in oppoſi-

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(W) [illegible] Lettre, Nouvelles de la République des Lettres, Octobre 1703. p. [illegible]

(X) Gregory's Church Hiſtory, vol. i. cent. 1.

(Y) Pliny, book 5. cap. 17. Solinus, cap. 35. p. 43.

(Z) Symbols derived from the art of building, were alſo employed by the Pythagoreans, for conveying inſtruction to thoſe who were initiated into their fraternity. Vid. Proclus in Eucl. lib. xi. def. 2. &c.

(A) Memoirs of Jacobiniſm, vol. ii. p. 357—360.

(B) Vid. Barruel, vol. ii. p. 377. [illegible] time of Pythagoras, or at the [illegible] tion to authentic hiſtory, lays to their charge, it is to the glory of their poſterity, that they have ſhaken off the yoke, and embraced that heavenly light which their anceſtors [illegible] to accept.

[illegible]

35. Having finiſhed what may properly be denominated the ancient hiſtory of free maſonry, we are now to trace its progreſs from the abolition of the heathen rites, in the reign of Theodoſius, to the preſent day; and, though the friends and enemies of the order ſeem to coincide in opinion upon this part of its hiſtory, the materials are as ſcanty as before, and the incidents equally unconnected. In thoſe ages of ignorance and diſorder which ſucceeded the deſtruction of the Roman empire, the minds of men were too much debaſed by ſuperſtition, and contracted by bigotry, to enter into aſſociations for promoting mental improvement and mutual benevolence. The ſpirit which then raged, was not a ſpirit of enquiry. The motives which then influenced the conduct of men, were not thoſe benevolent and correct principles of action which once diſtinguiſhed their anceſtors, and which ſtill diſtinguiſh their poſterity. Sequeſtered habits and unſocial diſpoſitions characterized the inhabitants of Europe, in this ſeaſon of mental degeneracy; while free maſons, actuated by very different principles, inculcate on their brethren the duties of ſocial intercourſe, and communicate to all within the pale of their order, the knowledge which they poſſeſs and the happineſs which they feel. But, if ſcience had exiſted in theſe ages, and if a deſire of ſocial intercourſe had animated the minds of men, the latter muſt have languiſhed for want of gratification, as long as the former was impriſoned within the walls of a convent, by the tyranny of ſuperſtition, or the jealouſy of power. Science was in theſe days ſynonimous with hereſy; and had any bold and enlightened man ventured upon philoſophical inveſtigations, and publiſhed his diſcoveries to the world, he would have been regarded by the vulgar as a magician, and puniſhed as a heretic by the church of Rome. Theſe remarks may be exemplified and confirmed by an appropriate inſtance of the interfering ſpirit of the Romiſh church, even in the ſixteenth century, when learning had made conſiderable advancement in Europe. The celebrated Baptiſta Porta having, like the ſage of Samos, travelled into diſtant countries for ſcientific information, returned to his native home, and eſtabliſhed a ſociety which he denominated the academy of ſecrets. He communicated the information which he had collected to the members of this aſſociation, who, in their turn, imparted to their companions the knowledge which they had individually obtained. But this little fraternity, advancing in reſpectability and ſcience, ſoon trembled under the rod of eccleſiaſtical oppreſſion; and experienced in its diſſolution, that the Romiſh hierarchy was determined to check the ardour of inveſtigation, and retain the human mind in its former fetters of ignorance and ſuperſtition. How then could free maſonry flouriſh, when the minds of men had ſuch an unfortunate propenſity to monkiſh retirement, and when every ſcientific and ſecret aſſociation was overawed and perſecuted by the rulers of Europe?

The academy of ſecrets [illegible]

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36. But, though the political and intellectual condition of ſociety was unfavourable to the progreſs of free maſonry; and, though the ſecret aſſociations of the ancients were diſſolved in the fifth century, by the command of the Roman emperor, yet there are many reaſons for believing that the ancient myſteries were obſerved in private, long after their public abolition, by thoſe enemies of Chriſtianity who were ſtill attached to the religion of their fathers. Some authors (c) even inform us, that this was actually the caſe, and that the Grecian rites exiſted in the eighth century, and were never completely aboliſhed, (Art. 20.). Theſe conſiderations enable us to connect the heathen myſteries, with that trading aſſociation of architects, which appeared, during the dark ages, under the ſpecial authority of the ſee of Rome.

Trading [illegible] th
dark ages

37. The inſatiable deſire for external finery, and gaudy ceremonies, which was diſplayed by the catholic prieſts in the exerciſe of their religion, introduced a correſponding deſire for ſplendid monaſteries, and magnificent cathedrals. But as the demand for theſe buildings was urgent, and continually increaſing, it was with great difficulty that artificers could be procured, even for the erection of ſuch pious works. In order to encourage the profeſſion of architecture, the biſhops of Rome, and the other potentates of Europe, conferred on the fraternity of free maſons the moſt important privileges; and allowed them to be governed by laws, cuſtoms, and ceremonies, peculiar to themſelves. The aſſociation was compoſed of men of all nations, of Italian, Greek, French, German, and Flemiſh artiſts, who were denominated free maſons, and who, ranging from one country to another, erected thoſe elegant churches and cathedrals, which, though they once gratified the pride and ſheltered the rites of a corrupted prieſthood, now excite the notice of antiquarians, and adminiſter to the grandeur of kingdoms. The government of this aſſociation was remarkably regular. Its members lived in a camp of huts, reared beſide the building in which they were employed. A ſurveyor, or maſter, preſided over and directed the whole. Every tenth man was called a warden, and overlooked thoſe who were under his charge; and ſuch artificers as were not members of this fraternity, were prohibited from engaging in thoſe buildings which free maſons alone had a title to rear (D). It may ſeem ſtrange, and perhaps inconſiſtent with what we have already ſaid, that the fraternity of free maſons ſhould have been ſanctioned, and even protected by the biſhops of Rome. Secret aſſociations, indeed, are always a terror to temporal and ſpiritual tyranny. But the church of Rome, inſtead of approving of the principles of free maſonry, by the encouragement and patronage which they gave to architects, only employed them as inſtruments for gratifying their vanity, and ſatiating their ambition. For in after ages, when maſons were more numerous, and when the demand for religious ſtructures was leſs urgent than before, the biſhops of Rome deprived the fraternity of

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(c) Gibbon, 8vo. vol. v. p. 11.

(D) Wren's Parentalia, or a Hiſtory of the Family of Wren, p. 306, 307. Henry's Hiſtory of Great Britain, 8vo. vol. viii. p. 273. B. iv. chap. 5. § 1. Robiſon's Proofs of a Conſpiracy, p. 21.

Maſonry.

thoſe very privileges which had been conferred upon them without heſitation, and perſecuted, with unrelenting rage, the very men whom they had voluntarily taken into favour, and who had contributed to the grandeur of their eccleſiaſtical eſtabliſhment.

[illegible]

38. Wherever the catholic religion was taught, the meetings of free maſons were ſanctioned and patronized. The principles of the order were even imported into Scotland (E), where they continued, for many ages, in their primitive ſimplicity, long after they had been extinguiſhed in the continental kingdoms. In this manner, Scotland became the centre from which their principles again iſſued, to illuminate, not only the nations on the continent, but every civilized portion of habitable world. What thoſe cauſes were which continued the ſocieties of free maſons longer in Britain than in other countries, it may not, perhaps, be eaſy to determine; but as the fact itſelf is unqueſtionable, it muſt have ariſen, either from ſome favourable circumſtances in the political ſtate of Britain, which did not exiſt in the other governments of Europe; or from the ſuperior policy, by which the Britiſh maſons eluded the ſuſpicion of their enemies, and the ſuperior prudence with which they maintained the primitive ſimplicity and reſpectability of their order. The former of theſe cauſes, had, without doubt, a conſiderable ſhare, in producing the effect under conſideration; and we know for certain, that, in our own days, the latter has preſerved free maſonry in a flouriſhing condition throughout theſe united kingdoms, while, in other countries, the imprudence and fooliſh innovations of its members, have expoſed it to the ſevereſt and juſteſt cenſure, and, in many caſes, to the moſt violent perſecutions. It is a fact, requiring no confirmation, and reſulting from the moſt obvious cauſes, that free maſonry never flouriſhes in ſeaſons of public commotion; and even in Great Britain, though the ſeat of war is commonly in foreign countries, it has univerſally declined. But in thoſe lands which are the theatre of hoſtilities, it will be neglected in a ſtill greater degree; and, if theſe hoſtilities are long continued, or frequently recur, the very name and principles of the order muſt be ſoon extinguiſhed. Amid thoſe continual wars, therefore, which, during the middle ages, diſtracted and deſolated the continent of Europe, the aſſociation of architects would be ſoon diſſolved; while in the humble village of Kilwinning, on the weſtern coaſt of Scotland, they found a ſafe retreat from the violent convulſions of continental wars.

Connection between free maſonry and the knights templars.

39. Before we detail the progreſs of free maſonry, after its importation into Britain, it will be neceſſary to give ſome account of the knights templars, a fraternity of free maſons whoſe affluence and virtues often raiſed the envy of contemporaries, and whoſe unmerited and unhappy end muſt have often excited the compaſſion of poſterity. It would be needleſs labour to enter into any inveſtigation, in order to prove, that the order of the knights templars was a branch of free maſonry. This fact has been invariably acknowledged by free maſons themſelves; and none have been more zealous to eſtabliſh it than the enemies of their order (F). The former have admitted the fact, not becauſe it was creditable to them, but becauſe it was true; and the latter have ſupported it, becauſe by the aid of a little ſophiſtry, it might be employed to diſgrace their opponents.

Hiſtory of the knights templars.

40. The order of the knights templars was inſtituted during the cruſades, in the year 1118, by Hugo de Paganis, and Geoffrey of St Omers. It received this appellation becauſe its members originally reſided near the church in Jeruſalem, which was dedicated to our Saviour. Though the profeſſed object of this religious aſſociation was to protect thoſe Chriſtian pilgrims, whoſe miſtaken piety had led them to the holy city; yet it is almoſt beyond a doubt, that its chief and primary intention, was to practiſe and preſerve the rites and myſteries of maſonry. We know at leaſt, that the knights templars, not only poſſeſſed the myſteries, but performed the ceremonies, and inculcated the duties of free maſons; and it is equally certain, that the practiſing of theſe rites could contribute nothing to the protection and comfort of the Catholic pilgrims. Had the templars publicly avowed the real object of their inſtitution, inſtead of that favour which they ſo long enjoyed, they would have experienced the animoſity of the church of Rome. But as they were animated with a ſincere regard for the Catholic religion, and with a decided abhorrence for the infidel poſſeſſors of Judea, it was never once ſuſpected that they tranſacted any other buſineſs at their ſecret meetings, but that which concerned the regulation of their order, the advancement of religion, and the extirpation of its enemies. The many prodigies of valour which they exhibited againſt the infidels; the many charitable deeds which they performed towards the diſtreſſed pilgrims; and the many virtues which adorned their private character, procured them, from the rulers of Europe, that reſpect and authority to which they were ſo juſtly entitled, and which they ſo long maintained. But reſpect and authority were not the only rewards which they purchaſed by their virtues and military proweſs. From the munificence of the popes, the generoſity of the pious princes and nobles of Europe, and from the gratitude of thoſe opulent pilgrims, who, in the moments of diſtreſs, had experienced their kind aſſiſtance, the knights templars had acquired ſuch immenſe poſſeſſions in every kingdom of Europe, but particularly in France, that their revenues often exceeded thoſe of the ſecular princes. Thus independent in their circumſtances, and being fatigued with thoſe unſucceſsful ſtruggles againſt the infidels, which they had maintained with ſuch manly courage, they returned to their native land to enjoy, in

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(E) A. D. 1140. *Vid.* Statiſtical Account of Scotland, vol. xi. Pariſh of Kilwinning; or Edinburgh Magazine for April 1802, p. 24[illegible].

(F) *Vid.* Barruel's Memoirs of Jacobiniſm, vol. ii. p. 379—383. where this is attempted at ſome length. As Barruel, however, was unacquainted with the obſervances of the templars and maſons, he has attributed to both many abſurd rites which probably never exiſted but in his own mind. For the ſame reaſon he has omitted many points of reſemblance which would have eſtabliſhed the common opinion upon an immoveable foundation.

[illegible] and spirit [illegible] prosperity, which was the consequence of their [illegible] would be a sufficient punishment. This, however, was not the ſentiment of Philip the Fair. This barbarous monarch, instigated by [illegible] of the order; encouraged by the prospect of sharing in their ample revenues; and actuated only by a spirit which seldom resides in a human breaſt, impriſoned in one day all the templars in France, merely at the inſtance of two worthleſs members of the order, who had been diſgraced and puniſhed by their ſuperiors, for the enormity of their crimes. It was pretended by these base apostates, that the templars abjured our Saviour, that they spit upon his cross, that they burned their children, and committed other atrocious crimes, from which the human mind recoils with horror, and which could have been perpetrated only by men ſo completely abandoned as the informers themſelves. Under the pretence of diſcovering what degree of credit might be attached to theſe accuſations, the templars were extended on the rack till they confeſſed the crimes with which they were charged. Several of the knights, when stretched on this instrument of agony, made every acknowledgement which their perſecutors deſired. But others, retaining on the rack that fortitude and contempt of death which they had exhibited in the field, perſiſted in denying the crimes laid to their charge, and maintained with their lateſt breath, the innocence of their order. Many of thoſe, even, who had tamely ſubmitted to their perſecutors, retracted their ignominious confessions which the rack had extorted; and maintained their integrity in the midst of those flames which the barbarous Philip had kindled for their deſtruction. Fifty-nine of theſe unhappy men were burnt at Paris, by a slow fire; and the ſame vindictive and inhuman ſpirit was exhibited in the other provinces of France, and in the other nations of Europe. The fortitude which, in every country, was diſplayed by theſe unfortunate ſufferers, could have been inſpired by innocence alone; and is a ſtrong proof, that their minds were not ſo enervated by indolence, nor their bodies ſo enfeebled by luxury, as has been generally believed. The only murmurs which parted from their lips, were thoſe which expreſſed their anguiſh and remorſe, that they had betrayed, in the hour of pain, the intereſts of their order, and had con[illegible] guilty of crimes unworthy of a [illegible].

41. [illegible] was yet to come which was [illegible] The grand master Molay, and other dignitaries of the order still survived; and, though they had [illegible] they had over the minds of the vulgar, and their connection with many of the princes of Europe, rendered them formidable and dangerous to their oppressors. By the exertion of that influence, they might restore union to their dismembered party, and inspire them with courage to revenge the murder of their companions: or, by adopting a more cautious method, they might reveal, by uncontrovertible proofs, the charges for which they ſuffered; and, by intereſting all men in their behalf, they might expoſe Philip to the attacks of his own ſubjects, and to the hatred and contempt of Europe. Aware of the dangers to which his character and perſon would be expoſed by pardoning the ſurviving templars, the French monarch commanded the grand maſter and his brethren to be led out to a ſcaffold, erected for the purpoſe, and there to confeſs before the public, the enormities of which their order had been guilty, and the juſtice of the puniſhment which had been inflicted on their brethren. If they adhered to their former confeſſions, a full pardon was promiſed to them; but if they ſhould perſiſt in maintaining their innocence, they were threatened with deſtruction on a pile of wood, which the executioners had erected in their view, to awe them into compliance. While the multitude were standing around in awful expectation, ready, from the words of the priſoners, to juſtify or condemn their king, the venerable Molay, with a cheerful and undaunted countenance, advanced, in chains, to the edge of the ſcaffold; and, with a firm and impreſſive tone, thus addreſſed the ſpectators. "It is but juſt, that in this terrible day, and in the laſt moments of my life, I lay open the iniquity of falſehood, and make truth to triumph. I declare then, in the face of heaven and earth, and I confeſs, though to my eternal ſhame and confuſion, that I have committed the greateſt of crimes; but it has been only in acknowledging thoſe that have been charged with ſo much virulence upon an order, which truth obliges me to pronounce innocent. I made the firſt declaration they required of me, only to ſuſpend the exceſſive tortures of the rack, and mollify thoſe that made me endure them. I am ſenſible what torments they prepare for thoſe that have courage to revoke ſuch a confeſſion. But the horrible ſight which they preſent to my eyes, is not capable of making me confirm one lie by another. On a condition ſo infamous as that, I freely renounce life which is already but too odious to me. For what would it avail me to prolong a few miſerable days, when I muſt owe them only to the blackeſt of calumnies (G)." In conſequence of this manly revocation, the grand maſter and his companions were hurried into the flames, where they retained that contempt of death which they had exhibited on former occaſions. This mournful ſcene extorted tears from the loweſt of the vulgar. Four valiant knights, whoſe charity and valour had procured them the gratitude and applauſe of mankind, ſuffering,

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(G) Hiſtoire de Chevaliers Hoſpitaliers de Saint Jean de Jeruſalem, par Abbé Vertot, tom. ii. p. 101. 102.

[illegible], the most cruel and ignominious death, was indeed, a spectacle well calculated to excite emotions of pity in the hardest hearts: and, whatever opinion we may entertain concerning the character of that unhappy order, every mind of sensibility will compassionate the fate of the templars, and curſe the inhuman policy of Philip the Fair.

42. From this short and imperfect account of the origin and ruin of the knights templars, the reader will be enabled to underſtand the merits of the queſtion, reſpecting the innocence of that order, which it will be neceſſary here to conſider. The opinions of contemporary writers were too much influenced by party ſpirit, and religious zeal, to deſerve any regard in this inveſtigation. All thoſe writers (11), however, who are generally deemed impartial hiſtorians, and who were in no reſpects intereſted, either in the condemnation or acquittal of the templars, have, without heſitation, pronounced them innocent of the crimes laid to their charge, and imputed their deſtruction to the avarice and private reſentment of Philip. In the deciſion of theſe hiſtorians, the public had, in general, acquieſced, till their ſentiments were unſettled by the bold pretenſions, and the ſophiſtical reaſoning of Barruel. This writer has charged upon the templars all thoſe crimes with which their enemies had formerly loaded them: he has attempted to juſtify the ſeverity of the French king, and has reproached, with the bittereſt invective, the ſociety of free maſons, becauſe they were once connected with a fraternity, which, in his opinion, was ſo wicked and profane. While we endeavour, therefore, to defend the templars againſt theſe [illegible] calumnies, we ſhall, at the ſame time, be maintaining the reſpectability of the maſonic inſtitution, by vindicating its members from that imputed depravity, which, according to Barruel, they have inherited from their fathers.

43. In order to form an impartial judgement when deciding any ſentence which has been paſſed, without proper evidence, either againſt individuals or aſſociations, it is neceſſary to be acquainted with the motives and character of the accuſers, and with the benefits which might accrue to them and the [illegible] by the puniſhment or liberation of the accuſed. In the caſe before us, the accuſers had been diſgraced and impriſoned by the accuſed, for their villany and crimes. Their chief proſecutor and judge was actuated by motives of avarice and private reſentment; and [illegible] who had been languiſhing in obſcurity [illegible] with avidity the [illegible], [illegible] in thoſe ample [illegible] favour, which had been acquired by the ſuperior abilities of the knights templars. Their [illegible], the veneration which their name [illegible], was an object of envy: their opulent revenues were calculated to give trouble to a covetous mind, and the remarkable regularity of their conduct was no ſmall incitement to the exerciſe of detraction. Such were the motives and [illegible] of their [illegible]. Let us attend now to the [illegible] which were [illegible] forſooth, it was his opinion, that their ſucceſſors, the free maſons in France, were acceſſory to the murder of their king. What then were their crimes? it was ſaid, that they [illegible] was never produced, in which the child of a templar had diſappeared, and in which the tenderneſs of a mother, as would certainly have happened, remonſtrated againſt the murder of her child. They were ſaid to have committed the moſt unnatural of all crimes! and yet, no individual produced a ſpecific inſtance which he could corroborate by indubitable proof. They were accuſed of inſulting the croſs of Chriſt; and yet they had ſhed their blood in the defence of his religion. Of crimes like theſe, one may conceive a depraved individual to have been guilty; but to believe, that a reſpectable fraternity, conſiſting of thouſands of members, could be capable of ſuch enormities, requires a degree of [illegible] to which the moſt credulous will ſcarcely attain.

44. The innocence of the templars, and the injuſtice of Philip, will be ſtill more apparent, by conſidering the conduct of the latter, as related even by Barruel. This writer obſerves, "That two men, who had been impriſoned for their crimes, declared that they had ſome important diſcoveries to make concerning the knights templars, and that this declaration, though entitled to little credit, made the king determine on the diſſolution of the order, and arreſt on one day all the templars in his kingdom (1)." Here then was the moſt flagrant injuſtice in the very threſhold of the [illegible] important diſcoveries were which the criminals had to make, the French king [illegible] of the templars, on the deſtruction of an order whoſe [illegible] Barruel, to juſtify the conduct of Philip, becauſe he ſacrificed the duties of friendſhip to the principles of juſtice. But, when we take it in connection with the reſt of his conduct, it muſt inſpire every honeſt mind with a more degrading opinion of the head and heart of that perſecuting monarch.

[illegible] examinations,

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(11) Among theſe we may reckon Hume, [illegible] vol. viii. p. 43. and Vertot, *ut ſupra*.

(1) Memoirs of Jacobiniſm, vol. ii. p. [illegible]

(1) Ib. [illegible]

History. examinations, inquiries, confeſſions, trials, and councils which ſucceeded, as mere pretences of juſtice, reſorted to by that crafty prince, to deceive the eyes of his ſubjects, and ſanctify the demerits of his own conduct. By keeping this circumſtance in view, the intelligent reader will be enabled to underſtand the minute, though ſometimes contradictory, details of hiſtorians, reſpecting the trial and confeſſions of the knights templars; and, notwithſtanding the veil of juſtice with which the judges attempted to cover their proceedings, he will be enabled to develope the deteſtable principles upon which their trial was conducted, and the ſtill more deteſtable motives which invited Clement V. to partake in the guilt of Philip the Fair.

46. The moſt formidable, and indeed the only plauſible argument by which Barruel ſupports his opinions, is drawn from the confeſſions of the templars. He maintains that the avowals of the knights were free from compulſion, and that no ſet of men could be ſo baſe as to accuſe their brethren of crimes, of which they believed them to be entirely innocent. But the fallacy of his reaſoning will appear from the ſlighteſt reflection. It is a curious, though unqueſtionable fact, that, when an avowal muſt be made, men are more ready to accuſe themſelves of crimes of which they have never been guilty, than to confeſs thoſe which they have actually committed. Such as have attended to the operation of their own minds, particularly in the earlier part of life, will acquieſce in this extraordinary truth; and thoſe who have not had occaſion to obſerve it, will find, upon conſideration, that it is conſonant to the conſtitution of the human mind. When a man confeſſes himſelf guilty of a crime which he has really perpetrated, he is expoſed, not only to the reproaches of his own conſcience, but to thoſe of the world; and, ſhould he, at any time, retract his confeſſions, he muſt be aware that every ſubſequent enquiry would only confirm the truth of his firſt depoſition. But when a man, from a principle of fear, acknowledges the truth of accuſations with which he has been unjuſtly loaded, a ſenſe of his integrity and innocence ſupports him under the opprobrium of the world, and he is conſcious that his character will be vindicated by every inveſtigation, and that the confeſſions which he himſelf made, may at any time be proved to have been the offspring of neceſſity. Such undoubtedly were the feelings by which the templars were actuated. Convinced, that the crimes which they were deſired to acknowledge, were of ſuch an unnatural kind, that they could never be imputed, by any reaſonable man, to a numerous and hitherto reſpectable fraternity, they yielded to the ſolicitations of their perſecutors; with the well-grounded hope that future enquiry would remove the ſtain which the irreſiſtible deſire of ſelf-preſervation had prompted them to throw upon their character. From this very conſideration, indeed, namely, from the nature of the crimes charged upon the templars, have many eminent hiſtorians maintained the innocence of that unhappy order. But, were we even to allow with Barruel, in oppoſition to all hiſtory, that the avowals of the knights were free and numerous; by an application of the principles already laid down, we would from that circumſtance, prove the innocence, and not the guilt of the templars.

47. It is not, however, upon ſpeculative principles alone, that we can account for the confeſſions and ſubſequent recantations of the knights. There are, fortunately, ſome hiſtorical facts which furniſh a rational explanation of their conduct; but which Barruel, either from ignorance or deſign, has totally overlooked. About the commencement of the whole affair, Molay, the grand maſter of the order, had been examined at Paris. From the cauſes already explained, but particularly from a dread of thoſe torments, to which an obſtinate avowal of his innocence would expoſe him, he made every confeſſion which his perſecutors demanded; but he at the ſame time tranſmitted circular letters to an immenſe number of his brethren, requeſting them to make the ſame confeſſions with himſelf (L): for it was only by ſubmiſſive conduct, that they could hope to diſarm the fury of their enemies, and avert the blow which was threatened to their order. Agreeably to the requeſt of Molay, many of the templars made the ſame acknowledgements; while others with a morality more inflexible, and courage more undaunted, diſdained to do evil that good might come, and perſevered unto death in the avowal of their own innocence, and that of their order. Molay, however, and thoſe knights who had followed his example, ſoon perceived that though their ſubmiſſions had protected them from injury as individuals, they had nevertheleſs rather inflamed the rage of Philip againſt the order; and being now convinced that their acknowledgements of guilt had produced an effect oppoſite to what they expected, they boldly retracted their former avowals, and adopted that intrepid conduct of which we have already given a ſhort account. There is another circumſtance connected with this part of our ſubject, which, though not taken notice of by hiſtorians, is well deſerving of the reader's attention. It is aſſerted by all contemporary writers, whether the friends or adverſaries of the templars, that all thoſe knights who maintained their innocence, were condemned either to death, or to a puniſhment equally ſevere; while all who confeſſed, and adhered to their confeſſions, were either completely acquitted, or ſentenced to a few days faſting and prayer, or a ſhort impriſonment (M.) It is allowed alſo by theſe hiſtorians, and even by Barruel, that a very conſiderable number of the templars were altogether ignorant of the crimes perpetrated by the reſt, and that ſome who were privy to them, were not partakers in their guilt. In which claſs then are we to rank theſe innocent men? among thoſe who ſuffered or among thoſe who were ſaved? If among the former, their enemies were guilty of the moſt flagrant injuſtice and cruelty, in conſuming the innocent on the ſame pile with the guilty. If among the latter, they muſt have been compelled to confeſs themſelves guilty of crimes of which they were completely innocent.

48. In order to ſhow that the confeſſions of the templars

(L) Hiſtoire de Chevaliers Hoſpitaliers, par Abbé Vertot, tom. ii. p. 86.

(M) Some of them even received penſions for their confeſſions. See Vertot, tom. ii. 9. 91.

plars were voluntary, and not extorted by the rack. Barruel is obliged to deny facts which are admitted by every hiſtorian. But, leſt his readers ſhould not be ſo ſceptical on this point as himſelf, he takes care to inform them, that the Pope always declared, that all whoſe confeſſions were extorted by the rack, ſhould be regarded as innocent, and that no templar ſhould be ſubjected to it; that Clement V. rather favoured the templars, and that he ſent the moſt venerable perſons to interrogate thoſe whoſe *age and infirmities* prevented them from appearing before him. But who were thoſe aged and infirm templars to whom Clement is ſo compaſſionate? Were they men ſmarting under diſeaſes inflicted by the hand of heaven. Were they men whoſe aged limbs were unfit for the fatigues of a journey, or whoſe gray hairs had excited the pity of the Roman pontiff? No—they were a few undaunted knights whom the blood-extorting ſcrews of their tormentors had tortured and diſabled; whoſe fleſh had been lacerated on the rack, and whoſe bones had been disjointed or broken on the wheel. Theſe are the men, who, in the language of the above writer, were prevented by *their age and infirmities* from travelling to Poictiers, or who, in the more ſimple ſtile of the Pope himſelf, were unable *to ride on horſeback, or to bear any other method of conveyance whatever*.

49. Having thus endeavoured to vindicated the character of the templars from the accuſations of their enemies, it will be neceſſary to make a few remarks reſpecting the ceremonial obſervances which are attributed to them and their poſterity, by the author of the memoirs of Jacobiniſm. But this, our enemies well know, is forbidden ground, on which free maſons are prohibited to enter by the laws of their order. It is here, conſequently, that the moſt numerous, and apparently the moſt ſucceſsful attacks have been made, for we can be provided with no means of defence without laying open the myſteries of the fraternity. Conſcious of the diſadvantages under which free maſons labour, their adverſaries have fabricated the moſt frightful and fooliſh ceremonies, and impoſed them upon the world as the ceremonies of maſonry. Among this number, may be reckoned thoſe rites and oaths which Barruel aſcribes to the templars and their poſterity, but which, we ſoſemnly aver, have no connection either with the one or the other; and, were we permitted to divulge to the world the whole of our ritual ſyſtem, many who have duped the public by deceitful information, would ſtand abaſhed at their conduct; while others, who have confided in ſuch information, would be aſtoniſhed at the extent of their credulity. Then might free maſons defy, as they have done in every other point, the fabrications of the malicious, and the conjectures of the ignorant: then, too, might they mock at the ingenuity of the wiſe. But, as they are bound to preſerve from public view the rites of their order, it is highly diſingenuous to aſſail them in a quarter where reſiſtance is impoſſible, and where every unprincipled man may triumph with impunity. Is not this to aſſaſſinate an enemy with his hands tied behind his back? Is not this to reproach a foe who is deprived of the organs of utterance?

50. But there is another important conſideration, which, while it points out in a more ſtriking manner the diſingenuity of ſuch conduct, ſhould, at the ſame time, incite the candid enquirer to reject every calumny againſt ſecret aſſociations, ariſing from reports concerning their rites and ceremonies. If ever the ſecrets of free maſonry were betrayed, they muſt have been betrayed by men who were completely deſtitute of religious principle; who paid no reſpect to thoſe ties which unite the members of civil, as well as ſecret aſſociations; who, in ſhort, neither feared God, nor regarded man. Suppoſe, then, that a perſon, pretending to be a free maſon, offered to communicate, either to an individual, or to the public, the rites and ceremonies of his order. What degree of credit ſhould men of probity attach to the information thus received? A perſon addreſſes them under the character of a perjurer, offering to violate the moſt ſolemn engagements, and to divulge myſteries which have been concealed for ages. He may give them accurate information, or he may not. If the ſecrets which he offers to betray have been hitherto unknown, there is no poſſible way of aſcertaining the truth of his depoſition. And it is rather to be ſuſpected, that he will dupe his auditors by falſe information, than trample upon an engagement, guarded by the moſt awful ſanctions. He might, indeed, confirm by an oath, the truth of his aſſeveration; but, as he muſt have violated an oath equally ſolemn, no man of ſenſe will give him the ſmalleſt credit. But, ſuppoſing that he really divulges the ſecrets and ceremonies of free maſonry, it is clear, that he has not underſtood their true import, or, at leaſt, that they have made no impreſſion upon his mind. It is almoſt certain, therefore, that, from ignorance, or miſapprehenſion of their meaning, he will exhibit, under an aſpect calculated to excite ridicule, thoſe rites and ceremonies, which, if properly explained, would command admiration. If then it be ſo difficult for the uninitiated to diſcover the ſecrets of free maſonry, and ſtill more ſo to aſcertain their ſignification, if they ſhould diſcover them; what muſt we think of thoſe men who open their ears to every ſlanderous tale againſt free maſons, which unprincipled men may impoſe upon their credulity? What muſt we think of thoſe who reproach and vilify the order, upon the uncertain reports of cunning and intereſted men? We appeal to the impartial reader, if they are not equally baſe with the informers themſelves.

51. Such are the conſiderations by which we would attempt to repel thoſe charges and diſtorted facts, with which Barruel has calumniated the character, and diſfigured the hiſtory of the templars. They will be ſufficient, we hope, to remove thoſe erroneous impreſſions which the peruſal of the Memoirs of Jacobiniſm may have left upon the reader's mind. Although we have adopted the opinion of thoſe who maintain the innocence of that unfortunate order, we cannot coincide with them in believing, that, as individuals, they were free from blame. The templars were poſſeſſed of the ſame nature, and influenced by the ſame paſſions as their fellow men; and they were, unqueſtionably, expoſed to more ſtrong and numerous temptations. Some of the knights, therefore, may have been guilty of crimes, and theſe too of an aggravated kind, which, by a ſtrange, though not uncommon miſtake, might have been transferred to their order. But it was never proved that they were traitors, child-murderers, regicides, and infidels. A certain claſs of hiſtorians, in-

[illegible]

The evil which men do lives after them:
The good is oft interred with their bones.

52. But granting the [illegible] of their [illegible] principles, [illegible] Barruel [illegible] Is it [illegible] the [illegible] with the same [illegible]. If virtue had [illegible] here-[illegible] to these [illegible] from their connection with the templars; [illegible] for a templar's virtues, we should not be reproached for a templar's crimes. But the reasoning of Barruel is as repugnant to the dictates of experience as it is to those of common sense. Were not the inhabitants of England, at one period, [illegible], rebels, and regicides? But where now is the nation [illegible] in its religion, and more steady in its loyalty! Did not the French, at one time, torture, burn, and maſſacre their fellow citizens, from the fury of their religious zeal, and the ſtrength of their attachment to the Catholic communion? But what nation [illegible] influenced by religious principles, and leſs attached to the church of Rome! Did not the rulers of France, at one time, torment and aſſaſſinate hundreds of the templars, becauſe they deemed them infidels, traitors, and regicides? And [illegible] in these latter days, the very rulers of France themſelves, infidels, traitors, and regicides! But if the impartial reader ſhould, upon farther inquiry, give credit to the guilt of the templars; in order to remove the imputed ſtain which has been transferred to free maſons, it may be ſufficient to addreſs him in the words of the poet,

[illegible]

53. About the time of the knights templars, chivalry [illegible] its highest perfection. It had its exiſtence, indeed, prior to this period, but as it continued [illegible] long after the [illegible], it was thought proper to defer its conſideration till the preſent ſtage of our hiſtory. When chivalry made its firſt appearance, the moral and [illegible] principles. The religion of Jesus exiſted only in name. A [illegible] superstition had usurped its place, and threatened ruin to the reaſon and the dignity of man. The [illegible] of the lower orders were [illegible] to the intereſt of the great. War was carried on with a degree of ſavage cruelty, equalled only by the ſanguinary [illegible] of the beasts of prey; no clemency was shown to the vanquished, and no humanity to the captive. The female ſex, even, were ſunk below their natural level: They were doomed to the moſt laborious occupations, and were deserted and [illegible] by that very sex, on whose protection and sympathy they have so [illegible] a claim. To remedy these disorders, a few intelligent and pious men formed an aſſociation, whoſe members ſwore to defend the Chriſtian religion, to practiſe its morals, to protect widows, orphans, and the weaker ſex; and to decide judicially, and not by arms, the diſputes that might ariſe about their goods or effects. It was from this aſſociation, undoubtedly, that chivalry aroſe (N); and not, as ſome think, from the public inveſtiture with arms which was cuſtomary among the ancient Germans. But, whatever was its origin, chivalry produced a conſiderable change in the manners and ſentiments of the great. It could not, indeed, eradicate that ignorance and depravity which engendered thoſe awful evils which we have already enumerated. It has ſoftened, however, the ferocity of war. It has reſtored the fair ſex to that honourable rank which they now poſſeſs, and which at all times they are entitled to hold. It has inspired thoſe ſentiments of generosity, sympathy, and friendship, which have contributed ſo much to the civilization of the world; and has introduced that principle of honour which, though far from being a laudable motive to action, often checks the licentious, when moral and religious conſiderations would make no impreſſion upon their minds.

54. Such was the origin of chivalry and such the bleſſings which it imparted. That it was a branch of free maſonry, may be inferred from a varity of conſiderations, from the conſent of thoſe who have made the deepeſt reſearches into one, and who were intimately acquainted with the ſpirit, rites, and ceremonies of the other. They were both ceremonial inſtitutions. Important precepts were communicated to the members of each, for the regulation of their conduct as men, and as brethren of the order (O). The ceremonies of chivalry, like thoſe of free maſonry, though unintelligible to the vulgar, were always ſymbolical of ſome important truths (P). The object of both inſtitutions was the ſame, and the members bound themſelves, by an oath, to promote it with ardour and zeal (Q). In chivalry there were alſo different degrees of honour, through which the youths were obliged to paſs before they were inveſted with the dignity of knighthood (R); and the knights, like free maſons, were formed into fraternities or orders, diſtinguiſhed by different appellations (S).

Chivalry a branch of free masonry.

55 From

(N) Bontainvilliers on the Ancient Parliaments of France, letter fifth, quoted in Brydſon's Summary View of Heraldry, pp. 24, 25, 26.

(O) [illegible] Summary View of Heraldry, p. 21. (P) Id. p. 65. (Q) Id. p. 32.

(R) [illegible] (S) Id. p. 38, [illegible].

55. From these circumstances of reſemblance, we do not mean to infer that chivalry was free maſonry under another name; we mean only to ſhow that the two inſtitutions were intimately connected; that the former took its riſe from the latter, and borrowed from it, not only ſome of its ceremonial obſervances, but the leading features and the general outline of its conſtitution. Theſe points of ſimilarity, indeed, are in ſome caſes ſo ſtriking, that ſeveral learned men have affirmed that free maſonry was a ſecondary order of chivalry, and derived its origin from the uſages of that inſtitution (T). For what reaſons theſe authors deduce the forms of free maſonry from the ceremonies of chivalry, it is difficult to conjecture. The only argument which they adduce, is the ſimilarity of the inſtitutions; but they do not conſider, that this proves, with equal force, that free maſonry is the parent of chivalry. We have already ſhown, that there were many ſecret inſtitutions among the ancients, but particularly the fraternity of Dionyſian architects, which reſembled free maſonry in every thing but the name; and it requires no proof that theſe fraternities aroſe many hundred years before the exiſtence of chivalry. If then there be any reſemblance between the inſtitutions which we have been comparing, we muſt conſider free maſonry as the fountain, and chivalry only as the ſtream. The one was adapted to the habits of intelligent artiſts, and could flouriſh only in times of civilization and peace: the other was accommodated to the diſpoſitions of a martial age, and could exiſt only in ſeaſons of ignorance and war. With theſe obſervations, indeed, the hiſtory of both fraternities entirely correſponds. In the enlightened ages of Greece and Rome, when chivalry was unknown, free maſonry flouriſhed under the ſanction of government, and the patronage of intelligent men. But, during the reign of Gothic ignorance and barbarity, which followed the deſtruction of imperial Rome, free maſonry languiſhed in obſcurity, while chivalry ſucceeded in its place, and propoſed to accompliſh the ſame object by different means, which, though more rough and violent, were better ſuited to the manners of the age. And when ſcience and literature revived in Europe, and ſcattered thoſe clouds of ignorance and barbariſm with which ſhe had been overſhadowed, chivalry decayed along with the manners that gave it birth, while free maſonry aroſe with increaſing ſplendour, and advanced with the ſame pace as civilization and refinement.

The connection of chivalry and free masonry exemplified in the society of the templars.

56. The connection between chivalry and free maſonry, is excellently exemplified in the fraternity of the knights templars. It is well known that this aſſociation was an order of chivalry, that the templars performed its ceremonies, and were influenced by its precepts; and we have already ſhown, that the ſame aſſociation was initiated into the myſteries, and practiſed the rites of free maſonry (Art. [illegible]); and ſince they then exiſted in a double capacity, it muſt be evident to all who ſtudy the hiſtory of the templars, that their maſonic character chiefly predominated, and that they deduced the name of their inſtitution, and their external obſervances, from the uſages of chivalry, to conceal from the Roman pontiff the primary object of their order, and to hold their ſecret meetings free from ſuſpicion or alarm. About this time, indeed, the church of Rome ſanctioned the fraternity of operative maſons, and allowed them to perform their ceremonies without moleſtation or fear. But this clemency, as we have already ſhown, was the offspring of neceſſity (Art. 3[illegible].); and the ſame intereſted motive which prompted his holineſs to patronize that trading aſſociation, could never influence him to countenance the duplicity of the templars, or permit them to exiſt in their maſonic capacity. It was the diſcovery, indeed, of their being free maſons, of their aſſembling ſecretly, and performing ceremonies to which no ſtranger was admitted, that occaſioned thoſe awful calamities which befel their order. It will, no doubt, appear ſurpriſing to ſome readers, that ſuch zealous defenders of the Catholic religion ſhould practiſe the obſervances of an aſſociation, which the church of Rome has always perſecuted with the bittereſt hoſtility. But their ſurpriſe will ceaſe, when it is recollected, that even about the middle of the 18th century, when free maſonry was prohibited in the eccleſiaſtical ſtates, by a papal bull, the members of the Romiſh church adopted the ſame plan. So much attached were they to the principles and practice of the fraternity, that they eſtabliſhed a new ſecret aſſociation ſimilar to that of free maſonry, into which they profeſſed to admit none but zealous abettors of the papal hierarchy. In this manner, by flattering the pride of the church, they eluded its vigilance, and preſerved the ſpirit of free maſonry, by merely changing its name, and profeſſing to make it ſubſervient to the intereſt of the pontificate.

The templars were initiated by Syrian fraternities.

57. Before leaving this ſubject, it may be intereſting to ſome readers, and neceſſary for the ſatisfaction of others, to ſhow in what manner the knights templars became depoſitaries of the maſonic myſteries. We have already ſeen, that almoſt all the ſecret aſſociations of the ancients either flouriſhed or originated in Syria, and the adjacent countries. It was here that the Dionyſian artiſts, the Eſſenes, and the Kaſideans aroſe. From this country alſo came ſeveral members of that trading aſſociation of maſons, which appeared in Europe during the dark ages (U); and we are aſſured, that, notwithſtanding the unfavourable conditions of that province, there exiſts, at this day, on Mount Libanus, one of theſe Syriac fraternities (X). As the order of the templars, therefore, was originally formed in Syria, and exiſted there for a conſiderable time, it would be no

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(T) Chevalier Ramſay, See Robiſon's Proofs of a Conſpiracy, p. 33. Leyden's Preliminary Diſſertation to the Complaynt of Scotland, pp. 67. 71. and the preface to Guilliam's Diſplay of Heraldry, edit. 6th.

(U) Mr Clinch, who appears not to have been acquainted with this fact, ſuppoſes that free maſonry was introduced into Europe by means of the Gypſies. Anthologia Hibernica, for April 1794, p. 280. There was ſuch a conſtant communication between Aſia and Europe in the time of the cruſades, that the cuſtoms and manners of the one, muſt, in ſome meaſure, have been transferred to the other.

(X) Anthologia Hibernica, April 1794, p. 279.

no improbable ſuppoſition that they received their maſonic knowledge from the lodges in that quarter. But we are fortunately in this caſe not left to conjecture, for we are expreſsly informed by a foreign author (Y), who was well acquainted with the hiſtory and cuſtoms of Syria, that the knights templars were actually members of the Syriac fraternities.

Hiſtory of free maſonry in Britain.

58. Having thus compared free maſonry with thoſe ſecret aſſociations which aroſe during the dark ages; let us now direct our attention to its progreſs in Britain, after it was extinguiſhed in the other kingdoms of Europe. We have already ſeen that a trading fraternity of free maſons exiſted in Europe during the middle ages; that many ſpecial favours were conferred upon it by the Roman ſee; that they had the excluſive privilege of erecting thoſe magnificent buildings, which the pride of the church of Rome, and the miſguided zeal of its members, had prompted them to rear; and that ſeveral maſons travelled into Scotland, about the beginning of the 12th century, and imported into that country the principles and ceremonies of their order. And we have illuſtrated ſeveral cauſes which preſerved this aſſociation in Britain after its total diſſolution on the continent.

Free maſonry introduced into Scotland.

59. That free maſonry was introduced into Scotland by thoſe architects who built the abbey of Kilwinning, is manifeſt, not only from thoſe authentic documents, by which the exiſtence of the Kilwinning lodge has been traced back as far as the end of the 15th century, but by other collateral arguments, which amount almoſt to a demonſtration. In every country where the temporal and ſpiritual juriſdiction of the pope was acknowledged, there was a continual demand, particularly during the 12th century, for religious ſtructures, and conſequently for operative maſons, proportional to the piety of the inhabitants, and the opulence of their eccleſiaſtical eſtabliſhment; and there was no kingdom in Europe where the zeal of the inhabitants for popery was more ardent than in Scotland, where the kings and nobles were more liberal to the clergy, and where, of conſequence, the church was more richly endowed (Z). The demand, therefore, for elegant cathedrals and ingenious artiſts, muſt have been proportionably greater than in other countries, and that demand could be ſupplied only from the trading aſſociation on the continent. When we conſider, in addition to theſe facts, that this aſſociation monopolized the building of religious ſtructures in Chriſtendom; we are authoriſed to conclude, that thoſe numerous and elegant ruins, which ſtill adorn the villages of Scotland, were erected by foreign maſons, who introduced into this iſland the cuſtoms of their order.

And into England.

60. It was probably about this time, alſo, that free maſonry was introduced into England; but whether the Engliſh received it from the Scotch maſons at Kilwinning, or from other brethren who had arrived from the continent, there is no method of determining. The fraternity in England, however, maintain, that St Alban, the proto-martyr, who flouriſhed about the end of the third century, was the firſt who brought maſonry to Britain; that the brethren received a charter from King Athelſtane, and that his brother Edwin ſummoned all the lodges to meet at York, which formed the firſt grand lodge of England (A). But theſe are merely aſſertions, not only incapable of proof from authentic hiſtory, but inconſiſtent, alſo, with ſeveral hiſtorical events which reſt upon indubitable evidence (B). In ſupport of theſe opinions, indeed, it is alleged, that no other lodge has laid claim to greater antiquity than that of York, and that its juriſdiction over the other lodges in England has been invariably acknowledged by the whole fraternity. But this argument only proves that York was the birthplace of free maſonry in England. It brings no additional evidence in ſupport of the improbable ſtories about St Alban, Athelſtane, and Edwin. If the antiquity of free maſonry in Britain can be defended only by the forgery of ſilly and unintereſting ſtories, it does not deſerve to be defended at all. Thoſe who invent and propagate ſuch tales, do not, ſurely, conſider that they bring diſcredit upon their order by the warmth of their zeal; and that, by ſupporting what is falſe, they prevent thinking men from believing what is true.

Progreſs of free maſonry in Britain.

61. After the eſtabliſhment of the Kilwinning and York lodges, the principles of free maſonry were rapidly diffuſed throughout both kingdoms, and ſeveral lodges were erected in different parts of the iſland. As all theſe derived their exiſtence and authority from the two mother lodges, they were likewiſe under their juriſdiction and controul; and when any differences aroſe, that were connected with the art of building, they were referred to the general meetings of the fraternity, which were always held at Kilwinning and York. In this manner did free maſonry flouriſh for a while in Britain, after it was completely aboliſhed in every part of the world. But even here it was doomed to ſuffer a long and ſerious decline, and to experience thoſe alternate ſucceſſions of advancement and decay, which mark the hiſtory of every human inſtitution. And, though during ſeveral centuries after the importation of free maſonry into Britain, the brethren of the order held their public aſſemblies, and were ſometimes prohibited from meeting by the interference of the legiſlature, it can ſcarcely be ſaid to have attracted general attention till the beginning of the 17th century. The cauſes of this remarkable retardation which the progreſs of maſonry experienced, it is by no means difficult to diſcover. In conſequence of the important privileges which the order received from the church of Rome, many choſe the profeſſion of an architect, which, though at all times an honourable employment, was particularly in high requeſt during the middle ages. On this account, the

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(Y) Adler de Druſis Montis Libani. Rom. 1786.

(Z) The church poſſeſſed above one half of the property in the kingdom. Robertſon's Hiſtory of Scotland, vol. i. pp. 137, 65, 269.

(A) A. D. 926. Preſton's Illuſtrations of Maſonry, p. 148. Smith's Uſe and Abuſe of Free Maſonry, p. 51. Free Maſons' Calendar 1778.

(B) See Dr Plot's Natural Hiſtory of Staffordſhire, chap. viii. pp. 316—318.

the body of operative maſons increaſed to ſuch a degree, and the taſte, as well as the neceſſity for religious edifices, was ſo much diminiſhed, that a more than ſufficient number of hands could, at any time, be procured for ſupplying the demands of the church, and of pious individuals. There being now no ſcarcity of architects, the very reaſon which prompted the church to protect the fraternity, ceaſed to exiſt; they, therefore, withdrew from them that patronage, which they had ſpontaneouſly proffered, and denied them even the liberty of holding their ſecret aſſemblies. But theſe were not the only cauſes which produced ſuch a ſtriking change in the conduct of the church, to the maſonic order. The ſpirit of free maſonry, as we have already ſaid, was hoſtile to the principles of the church of Rome. The intention of the one was to enlighten the mind; the object and policy of the other to retain it in ignorance. When free maſonry flouriſhed, the power of the church muſt have decayed. The jealouſy of the latter, therefore, was arouſed; and, as the civil power in England and Scotland was almoſt always in the hands of eccleſiaſtics, the church and the ſtate were combined againſt the principles and practice of free maſonry (C). Along with theſe cauſes, the domeſtic and bloody wars, which convulſed the two kingdoms from the 13th to the 17th century, conſpired, in a great degree, to produce that decline of the fraternity for which we have been attempting to account.

Free maſonry flouriſhed in the reign of Henry VI.

62. But notwithſtanding theſe unfavourable circumſtances, free maſonry ſeems to have flouriſhed, and attracted the attention of the public in the reign of Henry VI. who, when a minor, aſcended the throne of England in 1422. In the third year of his reign, indeed, the parliament paſſed a ſevere act againſt the fraternity, at the inſtigation of Henry Beaufort, biſhop of Wincheſter, who was then entruſted with the education of the young king. They enacted that the maſons ſhould no longer hold their chapters and annual aſſemblies; that thoſe who ſummoned ſuch chapters and aſſemblies ſhould be conſidered as felons; and that thoſe who reſorted to them ſhould be fined and impriſoned (D). But it would appear that this act was never put in execution; for, in the year 1429, about five years after it was framed, a reſpectable lodge was held at Canterbury, under the patronage of the archbiſhop himſelf (E). When King Henry was able to take into his own hands the government of his kingdom, and to form an opinion of his own reſpecting the uſe and tendency of the maſonic fraternity, in order to atone for the rigorous conduct of his parliament, he not only permitted the order to hold their meetings without moleſtation, but honoured the lodges by his preſence as a brother. Before he was initiated, however, into the myſteries of the order, he ſeems to have examined, with ſcrupulous care, the nature of the inſtitution, and to have peruſed the charges and regulations of the fraternity, as collected from their ancient records. Theſe facts are contained in a paper written in the reign of his ſucceſſor, Edward IV. and confirmed by a manuſcript in King Henry's own hand-writing, which is familiar to every perſon who has ſtudied the hiſtory of the order. This manuſcript conſiſts of queſtions and anſwers reſpecting the nature and tendency of free maſonry, and ſeems to be the reſult of the king's examination of ſome of the brethren before he became a member of the fraternity. It was firſt procured from the Bodleian library by the celebrated Mr Locke, who tranſmitted it to the earl of Pembroke, accompanied with explanatory notes (F). In the title of the manuſcript, it is ſaid to have been faithfully copied from the hand-writing of King Henry VI. by John Leland, antiquarian, who, according to Mr Locke, was the celebrated antiquary of that name who lived in the 16th century, and was appointed by King Henry VIII. at the diſſolution of monaſteries, to ſearch for, and ſave ſuch books as were worthy of preſervation. As this manuſcript was originally printed at Frankfort, I was led to inquire what grounds there were for believing that the explanatory notes, and the letter to the earl of Pembroke which accompany it, were the production of Mr Locke. But I found that this had been uniformly taken for granted by every writer upon the ſubject, though the circumſtance is not mentioned in the large edition of Mr Locke's works. The ſtyle of the letter, however, and the acuteneſs of the annotations, reſemble ſo much that philoſopher's manner of writing, and the letter is ſo deſcriptive of Mr Locke's real ſituation at the time when it was written, that it is almoſt impoſſible to deny their authenticity. In the letter itſelf, which is dated 6th May 1696, Mr Locke remarks that he compoſed the notes for the ſake of Lady Maſham, who was become very fond of maſonry, and that the manuſcript had ſo much excited his own curioſity, that he was determined to enter into the fraternity the next time he went to London, which, he adds, will be very ſoon. Now Mr Locke was at this time reſiding at Oates, the country ſeat of Sir Francis Maſham, as appears from one of his letters to Mr Molyneux,

Account of a maſonic manuſcript.

which

(C) As a proof of the hoſtility of the church of Rome to ſecret aſſociations which pretended to enlighten the mind, we mentioned (p. 53. ſupra.) its treatment of the academy of ſecrets, inſtituted in the 16th century for the advancement of phyſical ſcience. When a local and temporary inſtitution drew down the vengeance of the Roman ſee, what muſt have been its conduct to a lodge of maſons? A farther account of the academy of ſecrets may be found in Prieſtley's Hiſtory of Viſion, vol. ii.

(D) 3 Henry VI. cap. 2. A. D. 1425, ſee Ruffhead's Statutes. Dr Plot's Natural Hiſtory of Staffordſhire, chap. viii. p. 318.

(E) Manuſcript Regiſter of William Molart, prior of Canterbury, p. 28. entitled, *Liberatio generalis Domini Gulielmi prioris Eccleſiæ Chriſti Cantuarenſis, erga feſtum natalis Domini* 1429. In this Regiſter are mentioned the names of the maſters, wardens, and other members of the lodge.

(F) This manuſcript was firſt printed at Franckfort in 1748, and afterwards reprinted in the London and Gentleman's Magazines for 1753. It may be ſeen in the lives of Leland, Hearne, and Wood, 8vo. Oxford, 1772. vol. i. pp. 96, 104. Appendix, N° viii.; and in Preſton's Illuſtrations of Maſonry, p. 110.

which is dated Oates, March 30. 1696; and it appears, that he actually went to London a short time after the date of May; for another letter to the same gentleman is dated London, 2d July 1696 (G). Notwithstanding these facts, Dr Plot maintains that free masonry was not patronised by King Henry VI. (H), and that those who have supported a different opinion, were ignorant of the laws and chronicles of their own country. Dr Plot may have been a good chemiſt and natural hiſtorian, but when our readers hear upon what foundation he has eſtabliſhed his opinion, they will agree with us in thinking that he was a bad logician. He observes, that an act was paſſed in the king's minority, prohibiting all general aſſemblies and chapters of free maſons, and that as this act was not repealed till 1562, by 5th Elizabeth, cap. 4. it was impoſſible that free maſonry could be patroniſed in the ſame reign in which it was prohibited. The fact is, that the act was not repealed by 5th Elizabeth, cap. 4. which does not contain a ſingle word about free maſons. If Dr Plot's argument, therefore, proves any thing, it would prove that free maſonry has not been patroniſed ſince the reign of Henry VI. for that act has never yet been repealed. But ſuppoſing that it was repealed, the prohibitory ſtatute in Henry's reign might never have been put in execution, as very often happens; and Dr Plot himſelf remarks, that the act 5th Elizabeth was not obſerved. It is plain, therefore, that inſtead of being impoſſible, it is highly probable that King Henry patroniſed the fraternity. When they were perſecuted by his parliament, he was only three years of age, and could neither approve nor diſapprove of its ſentence; and it was very natural, that when he came to the years of maturity, he ſhould undo a deed which his parliament had diſhonourably done.

[illegible] I.

63. While free maſonry was flouriſhing in England under the auſpices of Henry VI. it was at the ſame time patroniſed, in the ſiſter kingdom, by King James I. By the authority of this monarch, every grandmaſter who was choſen by the brethren, either from the nobility or clergy, and approved of by the crown, was entitled to an annual revenue of four pounds Scots from each maſter maſon, and likewiſe to a fee at the initiation of every new member. He was empowered to adjuſt any differences that might ariſe among the brethren, and to regulate thoſe affairs, connected with the fraternity, which it was improper to bring under the cognizance of the courts of law. The grandmaſter alſo appointed deputies or wardens, who reſided in the chief towns of Scotland, and managed the concerns of the order, when it was inconvenient to appeal to the grandmaſter himſelf (I).

[illegible] II.

64. In the reign of James II. free maſonry was by no means neglected. The office of grandmaſter was granted by the crown to William St Clair, earl of Orkney and Caithneſs, baron of Roſlin, and founder of the much admired chapel of Roſlin. On account of the attention which this nobleman paid to the intereſts of the order, and the rapid propagation of the royal art under his adminiſtration, King James II. made the office of grandmaſter hereditary to his heirs and ſucceſſors, in the barony of Roſlin; in which it continued till the inſtitution of the grand lodge of Scotland. The barons of Roſlin, in the capacity of hereditary grandmaſters, held their principal annual meetings at Kilwinning, the birthplace of Scotiſh maſonry, whilſt the lodge of that village granted conſtitutions and charters of erection to those brethren of the order, who were anxious that regular lodges ſhould be formed in different parts of the kingdom. These lodges all held of the lodge of Kilwinning; and, in token of their reſpect and ſubmiſſion, joined to their own name, that of their mother lodge, from whom they derived their exiſtence as a corporation (K).

65. During the reigns of the ſucceeding Scotiſh monarchs, free maſonry ſtill flouriſhed, though very little information can be procured reſpecting the ſtate of the fraternity. In the privy ſeal book of Scotland, however, there is a letter dated at Holyroodhouſe, 25th September 1590, and granted by King James VI. "to Patrick Copland of Udaught, for uſing and exercising the office of wardanrie over the art and craft of maſonrie, over all the boundis of Aberdeen, Banff, and Kincardine, to had wardan and juſtice courts within the ſaid boundis, and there to miniſter juſtice (L)." This letter confirms what has already been ſaid concerning the ſtate of maſonry in Scotland. It proves beyond diſpute, that the kings of Scotland nominated the office-bearers of the order; that theſe provincial maſters, or wardens, as they were then called, adminiſtered juſtice in every diſpute which concerned the "art and craft of maſonrie;" that lodges were eſtabliſhed in all parts of Scotland, even in thoſe remote, and, at that time, uncivilized counties of Aberdeen, Banff, and Kincardine; and it completely overturns the unfounded aſſertion of Dr Robiſon, who maintains (M), that the celebrated antiquary Elias Aſhmole, who was initiated in 1646, is the only diſtinct and unequivocal inſtance of a perſon being admitted into the fraternity who was not an architect by profeſſion.

Minutes of St Mary's chapel.

66. The minutes of St Mary's chapel, which is the oldeſt lodge in Edinburgh, extend as far back as the year 1598; but as they contain only the ordinary proceedings of the lodge, we can derive from them no particular information reſpecting the cuſtoms and condition of the fraternity. It appears, however, from theſe minutes, that Thomas Boſwell, Eſq. of Auchinleck, was made a warden of the lodge in the year 1600; and that the honourable Robert Moray, quartermaſter-general to the army in Scotland, was created a maſter maſon in 1641. Theſe facts are deſerving of notice, as they ſhow, in oppoſition to Dr Robiſon, that perſons were early admitted into the order, who were not architects by profeſſion.

67. When

(G) Locke's Works, folio, vol. iii.

(H) Natural Hiſtory of Staffordſhire, cap. viii. p. 316.

(I) Charter. Hay's MSS. See art. 61.

(K) Such as Canongate Kilwinning, &c.

(L) Privy Seal Book of Scotland, 61. F. 47.

(M) Proofs of a Conſpiracy, p. 21.

67. When James VI. ascended the throne of England, he seems to have neglected [illegible] in the advocates library, there are two charters granted by the Scotiſh maſons, appointing the Sinclairs of Roſlin their [illegible]. [illegible] is without a [illegible] point William St Clair of Roſlin, [illegible] ters, their "patrons and judges." The other is, in [illegible], dated 1630, in which they appoint Sir William St Clair of Roſlin, [illegible] in all time coming." In [illegible] of the crown, it is stated, that for ſome years the want of a protector had engendered many corruptions among the maſons, and had conſiderably retarded the progreſs of the craft; and that the appointment of William Sinclair, Eſq. was, with the advice and conſent of William Shaw, maſter of work to his majeſty. After preſiding over the order for many years, William St Clair went to Ireland, where he continued a conſiderable time; and, in conſequence of his departure, the ſecond charter was granted to his ſon Sir William St Clair, inveſting him with the ſame powers which his father enjoyed. It deſerves alſo to be remarked, that in both theſe deeds, the appointment of William Sinclair, earl of Orkney and Caithneſs, to the office of grandmaſter, by James II. of Scotland, is ſpoken of as a fact well known, and univerſally admitted. Theſe obſervations will ſet in a clear point of view what muſt hitherto have appeared a great inconſiſtency in the hiſtory of Scotiſh maſonry. In the deed by which William Sinclair, Eſq. of Roſlin, reſigned the office of hereditary grandmaſter in 1736, it is ſtated that his anceſtors, William and Sir William St Clair of Roſlin, were conſtituted patrons of the fraternity by the Scotiſh maſons themſelves; while it is well known, that the grant of hereditary grandmaſter was originally made by James II. of Scotland, to their anceſtor, William Sinclair, earl of Orkney and Caithneſs. But, when we conſider that James VI. by not exerciſing his power, virtually transferred to the craft the right of electing their office-bearers, the inconſiſtency vaniſhes; for Mr Sinclair and his predeceſſors, as far back as the date of theſe charters, held their office by the appointment of the fraternity itſelf. Leſt any of Mr Sinclair's poſterity, however, might, after his reſignation, lay claim to the office of grandmaſter, upon the pretence that this office was bequeathed to them by the grant of James II. to the earl of Caithneſs and his heirs; he renounces not only the right to the office which he derived from the brethren, but any right alſo, which, as a deſcendant of the earl of Caithneſs, he might claim from the grants of the Scotiſh monarchs.

68. Notwithſtanding thoſe civil commotions which diſturbed Britain in the 17th century, free maſonry flouriſhed in Scotland, under the auſpices of the Sinclairs of Roſlin. No particular event, however, which is worthy of notice, occurred during that time, or even during the remainder of the century. Th[illegible]

69. In the year 1736, William St Clair of Roſlin, [illegible] maſter ſhould not be vacant at his death. Having, therefore, [illegible] lodges, he repreſented to them the utility that would [illegible] in Scotland; and, at the ſame time, intimated his intention to reſign into the hands of the brethren, every title to that office which he at preſent poſſeſſed, or which his ſucceſſors might claim from the grants of the Scotiſh kings, and the kindneſs of the fraternity. In conſequence of this repreſentation, circular letters were diſpatched to all the lodges of Scotland, inviting them to appear, either by themſelves or proxies, on next St Andrew's day, to concur and aſſiſt in the election of a grandmaſter. When that day arrived, about 32 lodges aſſembled, and, after receiving the deed of reſignation from William Sinclair, proceeded to the election of another grandmaſter; when, on account of the zeal which William Sinclair of Roſlin had always ſhown for the honour and proſperity of the order, he was unanimouſly elected to that high office, and proclaimed grandmaſter maſon of all Scotland. Thus was inſtituted the grand lodge of Scotland, which continues to flouriſh at the preſent day.

The office [illegible]

Inſtitution of the grand lodge of Scotland in 1736.

70. We have already brought down the hiſtory of maſonry in England to the end nearly of the 15th century. During the whole of the 16th, and the beginning of the 17th century, no events occurred which can be inſerted in a general hiſtory of the order. The lodges continued to meet, but ſeem neither to have attracted the notice, nor excited the diſpleaſure of the legiſlature.

71. During the civil wars, however, between the king and the parliament, the fraternity appears to have been better known; and many were initiated into its myſteries, who were equally diſtinguiſhed by their literary talents, and their rank in life. Elias Aſhmole informs us, that he and Colonel Mainwaring were admitted into the order at Warrington, in October 1646 (n). This gentleman was the celebrated antiquarian who founded the Aſhmolean muſeum at Oxford. His attachment to the fraternity is evident from his diligent inquiries into its origin and hiſtory, and his long and frequent attendance upon its meetings (o). Charles II. too, was a member of the fraternity, and frequently honoured the lodges with his preſence (p). From this fact, chiefly, Dr Robiſon aſſerts, that free maſonry was employed by the royaliſts for promoting the cauſe of their ſovereign, and that the ritual of the maſter's degree ſeems to have been formed, or twiſted from its original inſtitution, in order to found the political princi-

[illegible] ſonry flouriſhed during the civil wars.

(n) Aſhmole's Diary, p. [illegible].

(o) Id. p. 66.

(p) Proofs of a Conſpiracy, p. [illegible].

ple of the candidate (Q). The ſtrained and fanciful analogy by which this evidence is ſupported, is perhaps one of the moſt ſtriking inſtances that could be adduced to ſhow, to what puerile arguments the moſt learned will reſort, when engaged in the defence of a deſperate cauſe. But though Dr Robiſon maintains, that all who witneſſed the ceremonies of the maſter's degree during the civil wars, could not fail to ſhow, by their countenances, to what party they belonged, yet he obſerves, in another part of his work, that the ſymbols of maſonry ſeemed to be equally ſuſceptible of every interpretation, and that none of theſe were entitled to any decided preference (R). Such inconſiſtencies as theſe it is not eaſy to explain.

Free maſonry ſuppoſed by ſome to have originated in the time of the commonwealth.

72. An opinion of an oppoſite nature, though equally extravagant, has been maintained by Pivati (S), and the author of "Free Maſonry Examined." Theſe writers aſſert, that free maſonry originated in the time of the Engliſh commonwealth; that Oliver Cromwell was its inventor; that the level was the ſymbol of republican equality; and that the other ſigns and ceremonies were merely arbitrary, and formed for concealing their political deſigns. It would be ridiculous to enter into a ſerious refutation of ſuch opinions as theſe, which are founded on the moſt unpardonable ignorance. That free maſonry exiſted before the time of Cromwell is as capable of demonſtration, as that Cromwell himſelf ever exiſted. It is really entertaining to obſerve, what inconſiſtent and oppoſite opinions are formed upon the ſame ſubject. According to one writer, free maſonry was invented and employed by the adherents of the king; according to another, it was deviſed by the friends of the parliament. In the opinion of ſome it originated among the Jeſuits, who uſed it for the promotion of their ſpiritual tyranny and ſuperſtition; while others maintain, that it aroſe among a number of unprincipled ſceptics, who employed it for deſtroying the ſpiritual tyranny and ſuperſtition of the Jeſuits!

Abſurdity of this opinion.

73. It was about this time, according to Dr Robiſon, that free maſonry was introduced among the continental kingdoms. After James II. of England had abdicated the throne, and taken refuge in France with ſeveral of his adherents, it is probable that they would communicate additional ſpirit to the French lodges; but that the Engliſh refugees were the firſt who exported maſonry from Britain, or that they employed it for re-eſtabliſhing the Stuart family on the Engliſh throne, it is impoſſible to prove. Such aſſertions Dr Robiſon has not only hazarded, but has employed them alſo as the foundation of defamatory concluſions, without adducing a ſingle proof in their ſupport. Notwithſtanding the difficulty, however, of determining the preciſe period when the principles of free maſonry were imported into France, it is manifeſt, from the univerſal conſent of the continental lodges, that it was of Britiſh origin; and it is more than probable, that the French received it from Scotland about the middle of the 16th century, during the minority of Queen Mary. It is well known, that there was at that time a freer intercourſe between Scotland and France than at any other period. Mary queen of Scots was then married to the heir-apparent of France; and Mary of Guiſe, ſiſter to the French king, was at the ſame time regent of Scotland. In conſequence of this intimate connection between the two kingdoms, French troops were ſent to the aſſiſtance of the Scots, who, having reſided many years in the kingdom, and habituated to the manners and cuſtoms of their allies, would naturally carry along with them into their native country, thoſe cuſtoms which afforded them pleaſure; and none we know could be more congenial to the taſte and diſpoſitions of Frenchmen, than the ceremonial obſervances of free maſonry. But it is not upon theſe conſiderations merely that our opinion depends. It receives ample confirmation from a fact, of which Dr Robiſon ſeems to have been totally ignorant. In the year 1645, a particular juriſdiction for maſons, called *maçonnerie*, or *maſonry*, was eſtabliſhed in France. All differences which related to the art of building, were decided by particular judges who were called overſeers of the art of maſonry; and ſeveral counſellors were appointed for pleading the cauſes, which were referred to their deciſion (T). This inſtitution has ſuch a ſtriking reſemblance to the warden courts which exiſted in Scotland in the 16th century, art. 65. that it muſt have derived its origin from theſe. In both of them, thoſe cauſes only were decided which related to maſonry, and overſeers were choſen in both for bringing theſe cauſes to a deciſion (U). But as ſimilar tribunals were held in no other part of the world, and as the warden courts were firſt eſtabliſhed in Scotland, it is almoſt certain, that the French borrowed from the Scots the idea of their maſonic tribunal, as well as free maſonry itſelf, at that particular period when there was ſuch a free communication between the two kingdoms. That the French received free maſonry from Scotland, may be preſumed alſo from the ſingular pre-eminence which was always given by foreigners to Scotiſh maſonry, and from the degree of *Chevalier Maçon Ecoſſois*, which, as a mark of reſpect to Scotland, the French had added to the three ſymbolical degrees of maſonry about the beginning of the 18th century. Had free maſonry not been introduced into France till after the revolution in 1688, as Dr Robiſon affirms, it is wonderful how ſuch a fact ſhould have been ſo quickly forgotten; for it was unknown about 30 or 40 years afterwards, at what period the French received

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(Q) Proofs of Conſpiracy, p. 21.

(R) Id. p. 99.

(S) Pivati Art. Liberi Muratori auvero Francs Maçons Venezia, quoted by Mr Clinch.

(T) Maçonnerie eſt auſſi le nom d'une juriſdiction particulière pour les maçons : Elle ſe tient au palais à Paris, et les appellations ſont portées au parlement : cette juriſdiction a été etablie en 1645. Ceux qui l'exercent ſont appellés Generaux des Oeuvres de Maçonnerie de France. Ils connoiſſent de differends entre les œuvriers concernant le fait des batimonts. La maçonnerie a des procureurs particulières, differens de ceux de parlement, qui cependant peuvent y plaider. Dictionnaire de Trevoux, vol. v. p. 23.

(U) See Appendix, N° ii.

received it from Britain; and, if the exiled family had employed free masonry for overturning the Hanoverian succeſsion, it is ſtill more ſtrange that ſuch a circumſtance ſhould be unknown in a country, where concealment was certainly unneceſſary. When any new cuſtom is introduced into a nation, the time of its introduction may be remembered for 70 or 80 years by one individual, without being committed to writing; and, though it be not of ſufficient importance, tradition will preſerve it from oblivion for a much greater length of time. If free maſonry, therefore, never exiſted in France till after the revolution in 1688, is it not abſurd to ſuppoſe, that the period when ſuch a ſingular inſtitution was eſtabliſhed, ſhould be utterly forgotten at the diſtance of 30 or 40 years from its eſtabliſhment, though, during that time, it was never perſecuted by the French government?

Innovation on free maſonry in France.

74. But, at whatever period, and from whatever ſource free maſonry was introduced into France, it aſſumed there a very remarkable form. The attachment of that people to innovation and external finery, produced the moſt unwarrantable alterations upon the principles and ceremonies of the order. A number of new degrees were created; the office-bearers of the craft were arrayed in the moſt ſplendid and coſtly attire; and the lodges were transformed into lecturing rooms, where the wiſer brethren ſupported the moſt extravagant opinions, diſcuſſed the abſtruſeſt queſtions in theology and political economy, and broached opinions hoſtile to the intereſts of true religion and ſound government. In the other countries of the continent, ſimilar innovations, in a greater or leſs degree, prevailed, while the Britiſh lodges preſerved the principles of the craft in their primitive ſimplicity and excellence. Such dangerous innovations have not the ſmalleſt connection with the principles of free maſonry. They are unnatural excreſcences formed by a warm imagination, and foſtered by the interference of deſigning men. Thoſe who reprehend free maſonry, therefore, for the changes which it underwent in the hands of foreigners, may throw equal blame upon religion, becauſe it has been a cloak for licentiouſneſs and hypocriſy; or, upon ſcience, becauſe it has been converted into an inſtrument of iniquity. The changes of which we have been treating, aroſe altogether from the political condition of the countries where they were made. In France, and the other kingdoms of Europe, where popery was the eccleſiaſtical eſtabliſhment, or where abſolute power was in the hands of their monarchs, the moſt ſlaviſh reſtraints were impoſed upon the conduct and converſation of the people. None durſt utter his own ſentiments, or converſe upon ſuch metaphyſical ſubjects as militated againſt the theology and politics of the times. Under ſuch reſtraints ſpeculative men, in particular, were highly diſſatisfied. Thoſe powers which heaven had beſtowed, and on the exerciſe of which their happineſs depended, were fettered by human laws, and that liberty of ſpeech reſtrained which tyranny had no right to controul. For theſe reaſons, the lodges were frequented by men of philoſophical habits, who eagerly embraced an opportunity of publiſhing their ſentiments, and diſcuſſing the favourite objects of their ſtudy, without dreading the threats of government, or the tortures of the inquiſition. In this view, the lodges may be compared to little republics, enjoying the rational liberties of human nature, in the midſt of an extenſive empire, enſlaved by [illegible] and ſuperſtition. In theſe little ſtates, however, that liberty was [illegible] in [illegible] and [illegible] preſs. [illegible] whol-ly from the political condition of the continental kingdoms. In Britain, where the craft flouriſhed much longer than in any other country, the order is ſtained by no glaring corruptions or offenſive innovations; more attention was paid to the intrinſic value of the order, than to its external obſervances; and the Britiſh lodges had a greater reſemblance to charitable meetings, than to pompous and ſplendid aſſemblies. Bleſſed with a free conſtitution, and the enjoyment of every liberty which does not approach to licentiouſneſs, the Britiſh maſons were under no temptation to introduce into their lodges religious and political diſcuſſions. The liberty of the preſs enables them to give the wideſt circulation to their opinions, however new or extravagant; and they are liable to no puniſhment, by publicly attacking the eſtabliſhed religion of their country. The Britiſh lodges, therefore, have retained their primitive purity; they have been employed in no ſiniſter cauſe; they have harboured in their boſom neither traitors, nor atheiſts, nor French philoſophers.

Cauſe of its purity in Britain.

75. While the French were buſily engaged in the decoration of their lodges, and in the invention of new degrees and trifling ceremonies, the maſons in England were more wiſely employed in extending the boundaries of the royal art. About the beginning of the 18th century, during the reign of Queen Anne, free maſonry ſeems to have rapidly declined in the ſouth of England. Four lodges only exiſted in the ſouth, and few hopes could be entertained of revival, while the ſeat of the grand lodge was at ſuch a diſtance as the city of York. In ſuch circumſtances the four lodges met in 1717, and, in order to give vigour to their declining cauſe, and advance the intereſts of the fraternity in the ſouth, they elected themſelves into a grand lodge, and choſe Anthony Sayer, Eſq. for their firſt grandmaſter. Thus was inſtituted the grand lodge of England, which has now attained to ſuch a pitch of proſperity and ſplendour. The motive which ſuggeſted this inſtitution, was certainly laudable and uſeful; but every perſon muſt be aware, that the four lodges were guilty of a conſiderable impropriety in omitting to requeſt the countenance of the grand lodge of York. Notwithſtanding this negligence, the greateſt harmony ſubſiſted between the two grand lodges till 1734; and under the auſpices of both, the order flouriſhed in every part of the kingdom, but particularly in the ſouth of England, where it had formerly been in ſuch a languiſhing condition. In the year 1734, however, the grand lodge of England having granted conſtitutions to lodges within the diſtrict of York, without the conſent of their grand lodge, incurred to ſuch a degree the diſpleaſure of the York maſons, that the friendly intercourſe which had formerly ſubſiſted between them, was completely broken off; and the proſperity of the one was always viewed by the other with a ſuſpicious eye. In 1739 alſo ſome trifling innovations upon the ancient [illegible] of the order, having been imprudently ſanctioned by the grand lodge of England, ſeveral of the old London

Inſtitution of the grand lodge of England in 1717.

lodges

Maſonry.

maſons were highly offended, and, after ſeceding from the grand lodge, and pretending to act under the York conſtitution, they arrogated the appellation of *ancient Maſons*, and beſtowed upon thoſe connected with the grand lodge the odious appellation of *Moderns*, who, in their opinion, never exiſted till the year 1717. The ancient maſons, after their ſeceſſion, continued to hold their meetings, without acknowledging a ſuperior, till the year 1772, when they choſe for their grandmaſter the duke of Athol, who was then grandmaſter elect for Scotland. Since that period both the grand lodges of England have attained to a high degree of proſperity; but ſuch is their mutual antipathy, that the members of the one have no correſpondence or communion with thoſe of the other. The Iriſh and Scotiſh maſons, however, who ſeem rather to favour the ancients, hold communion with both the grand lodges, and are allowed to be preſent at all their meetings. It is much to be regretted, that ſuch reſpectable bodies as the two grand lodges of England, ſhould retard the progreſs of maſonry by their mutual jealouſies and diſſenſions. Schiſms in ſocieties generally ariſe from miſconduct on both ſides, which was certainly the caſe in the ſchiſm under conſideration. The moderns undoubtedly departed from their uſual caution and propriety of conduct, by authoriſing the ſlighteſt innovations upon the ceremonies of an ancient inſtitution. But the ancients have been guilty of a greater impropriety by being the active promoters of the ſchiſm; and ſtill more, by holding up the moderns to the ridicule of the public. If theſe errors, however, were mutually acknowledged, and buried in oblivion, that breach would ſoon be repaired which has ſo long ſeparated the two lodges, and which the Scotiſh and Iriſh maſons have always regarded with pity and indignation.

Free maſonry introduced into different parts of the world.

76. After the inſtitution of the grand lodge of England in 1717, free maſonry aſſumed a bolder and a more independent aſpect. It was no longer confined to the Britiſh iſles, or to the capital of France, but was deſtined to irradiate every portion of the globe; and, while the grand lodges of Scotland and England contemplated with pleaſure the propagation of the royal art, their diligence was fully rewarded by the gratitude and liberality of the foreign lodges, for the gift which they received.

Into the Eaſt Indies, America, Germany, Africa, &c.

77. In the year 1729 free maſonry was introduced into the Eaſt Indies; and, in a ſhort time after, a provincial grandmaſter was appointed to ſuperintend the lodges in that quarter. In 1730 the grand lodge of Ireland was inſtituted; lodges were erected in different parts of America; and a provincial deputation granted to M. Thuanus, for the circle of Lower Saxony. A patent was ſent from England in 1731, to erect a lodge at the Hague, in which Francis Stephen, duke of Lorrain, and afterwards emperor of Germany, was initiated into the order; and provincial grandmaſters were appointed for Ruſſia, and Andaluſia in Spain. In 1736 lodges were erected at Cape Coaſt, in Africa, and at Geneva; and provincial deputations were granted for Upper Saxony and the American iſlands. In 1738, a lodge was inſtituted at Brunſwick, under the patronage of the grand lodge of Scotland, in which the late king of Pruſſia was initiated when prince royal. His majeſty was ſo pleaſed with the maxims and ceremonies of the order, that he, ever afterwards, was its moſt zealous partizan, and even requeſted that a lodge ſhould be eſtabliſhed in the capital of his own dominions. In this lodge many of the German princes were initiated, who afterwards filled the office of grandmaſter, with much honour to themſelves, and advantage to the fraternity.

Maſonry.

Free maſonry perſecuted in Holland.

78. But while free maſonry flouriſhed in theſe different parts of the world, and in many other places which it would be tedious to enumerate, it was deſtined to undergo a variety of perſecutions from the unfounded jealouſies of a few deſpotic rulers, and the deep rooted ſuperſtition of a few Catholic prieſts. Theſe perſecutions took their riſe in Holland in the year 1735. The States General were alarmed at the rapid increaſe of free maſons, who held their meetings in every town under their government; and as they could not believe that architecture and brotherly love were their only objects, they reſolved to diſcountenance their proceedings. In conſequence of this determination, an edict was iſſued by government, ſtating, that though they had diſcovered nothing in the practices of the fraternity, either injurious to the intereſts of the republic, or contrary to the character of good citizens; yet, in order to prevent any bad conſequences which might enſue from ſuch aſſociations, they deemed it prudent to aboliſh the aſſemblies of free maſons. Notwithſtanding this prohibition, a reſpectable lodge continued to meet privately at Amſterdam; but intelligence having been communicated to the magiſtrates, all the members were arreſted and brought before the court of juſtice. At this tribunal, in preſence of all the magiſtrates of the city, the maſters and wardens boldly defended themſelves; and declared upon oath, that they were loyal ſubjects, faithful to their religion, and zealous for the intereſts of their country; that free maſonry was an inſtitution venerable in itſelf, and uſeful to ſociety; and that though they could not reveal the ſecrets and ceremonies of their order, they could aſſure the judges that they were contrary to the laws neither of God nor man, and that they would willingly admit into their order any individual in whom the magiſtrates could confide, and from whom they might receive ſuch information as would ſatisfy a reaſonable mind. In conſequence of theſe declarations, the brethren were diſmiſſed, and the town ſecretary requeſted to become a member of the fraternity. After initiation he returned to the court of juſtice, and gave ſuch a favourable account of the principles and practice of the ſociety, that all the magiſtrates became brethren of the order, and zealous patrons of free maſonry.

Free maſonry perſecuted in France;

79. After free maſonry had thus honourably triumphed over her perſecutors in Holland, ſhe had to contend in France with prejudices equally inveterate though leſs inſuperable. Although many perſons of diſtinction defended the fraternity, and expoſtulated with the court on the impropriety of ſevere meaſures, their aſſemblies were aboliſhed in 1737, under the common pretext that ſome dreadful deſign was concealed beneath their inviolable ſecrets, hoſtile to religion, and dangerous to the kingdom. But when theſe ebullitions of party ſpirit and private malice had ſubſided, the prohibition of government was gradually forgotten, and the fraternity in France recovered their former proſperity and ſplendour.

And in Germany.

80. In Germany too, the tranquillity of the order

was diſturbed by the intrigues of ſome [illegible]. [illegible] [illegible] [illegible] of free maſonry. Having been foiled in all their [illegible] of their huſbands, and the fondneſs of their admirers, they converted their curioſity into revenge, and attempted to inflame the mind of Maria Thereſa the empreſs queen, againſt the lodges in Vienna. Their attempt was in ſome meaſure ſucceſsful, as they perſuaded her to iſſue an order for ſurpriſing all the maſons in the city when aſſembled in their lodges. This plan, however, was fruſtrated by the intervention of the emperor Joſeph I. who being himſelf a maſon, pledged himſelf for the good conduct of his brethren, and ſhewed the ladies and their friends, that their charges againſt the order were falſe and defamatory.

Free maſons perſecuted in Italy

81. When the flame of perſecution is once kindled, its devaſtations are ſeldom confined to the ſpot where it originated. The example of one nation is urged as an excuſe for the conduct of another; and like the ſtorm on the ſandy deſert, its effects are ruinous in proportion to its progreſs. In Holland and France the hoſtility of the government againſt free maſonry was ſoon diſarmed. But when the flame reached the eccleſiaſtical ſtates of Italy, its effects were more baneful and its duration more lengthened. In the year 1738, a formidable bull was thundered from the conclave, not only againſt free maſons themſelves, but againſt all thoſe who countenanced a ſet of men who, in the opinion of his holineſs, were enemies to the tranquillity of the ſtate, and hoſtile to the ſpiritual intereſts of ſouls. This bull was followed by an edict dated 14th January 1739, in which the ſervitude of the galleys, the tortures of the rack, and a fine of 1000 crowns in gold, were threatened to perſons of every deſcription who breathed the infectious air of a maſonic aſſembly. A few weeks afterwards a decree was iſſued by his holineſs condemning a French book, entitled An Apology for the Society of Free Maſons, and ordering it to be burnt by the miniſters of juſtice, in one of the beſt frequented ſtreets of Rome.

And in Holland.

82. In conſequence of theſe enactments at Rome, the catholic clergymen in Holland attempted in 1740 to enforce obedience to the decrees of their ſuperiors. In examining the religious qualifications of thoſe who required a certificate to receive the holy ſacrament, the prieſts took occaſion to refuſe the certificate to ſuch as were free maſons, and expelled them for ever from the communion table. Having exerted their authority in the expulſion of ſeveral reſpectable characters, the attention of the public was rouſed by ſuch arbitrary proceedings, and after the publication of ſeveral pamphlets by the adherents of both parties, the ſtates general interfered, and prohibited the exerciſe of that ſpiritual power, which, inſtead of ſuppreſſing immorality, had excited diviſions among their fellow ſubjects.

Inſtitution of the aſſociation of the maſons.

83. In order to preſerve the order from that ruin to which it ſeemed faſt approaching, ſeveral free maſons of diſtinction in Germany who were friendly to the church of Rome, inſtituted a new aſſociation formed on the ſame principles, and propoſing to itſelf the ſame object as free maſonry. The members were denominated *mopſes*, from the German word *mops*, ſignifying a young maſtiff, which was deemed a proper emblem of the mutual fidelity and attachment of the brethren. But that they might preſerve the myſteries of free maſonry from [illegible] Rome, they [illegible] promiſe, and admitted women into their new aſſociation. The mopſes were patroniſed by the moſt illuſtrious characters in Germany, and ſeveral princes of the empire were grand maſters of the order. The hoſtility of the Roman ſee to the proteſtants in Germany induced the mopſes to exclude them from their fraternity; but this was merely a pretence to deceive his holineſs, for they afterwards admitted men of every religion and of every country.

84. As the authority of the pope did not extend to Switzerland, free maſonry flouriſhed in that republic till 1741, when the council of Berne iſſued an edict prohibiting under the ſevereſt penalties the aſſemblies of free maſons. No reaſon was aſſigned for this conduct, and no charges advanced againſt the order. The council of Berne are terrified for ſecret aſſociations, and therefore they muſt oppreſs and perſecute them. Not ſatisfied with aboliſhing the lodges in the republic, they decreed that every free maſon muſt accuſe himſelf before the magiſtrates of the diſtrict, that he muſt renounce his obligations to ſecrecy, and ſwear in the preſence of the Almighty, to trample upon thoſe engagements, which before the ſame Being they had ſworn to reverſe. Such an inſtance of tyranny over the minds and conſciences of men, is a remarkable fact in the hiſtory of a republic where the reformed religion had been practiſed from its infancy, and where free maſons had always conducted themſelves with exemplary propriety.

Free maſonry perſecuted in Scotland.

85. The perſecutions which free maſonry encountered were hitherto confined to the continent. The tide of religious frenzy, however, now rolled to the ſhores of Britain. In the year [illegible], the Aſſociate Synod attempted to diſturb the peace of the fraternity; and had they been poſſeſſed of half the power of the church of Rome or the council of Berne, their proceedings, prompted by equal fanaticiſm, would have been marked with the ſame ſeverity; but, fortunately for the order, their power extended only to the ſpiritual concerns of thoſe delinquents who were of the ſame ſect with themſelves. In the beginning of the year 1745, an overture was laid before the ſynod of Stirling, ſtating that many improper things were performed at the initiation of maſons, and requeſting that the ſynod would conſider whether or not the members of that order were entitled to partake in the ordinances of religion. The ſynod remitted this overture to all the kirk-ſeſſions under their inſpection, allowing them to act as they thought proper. In 1755, however, they appointed all their kirk-ſeſſions to examine every perſon who was ſuſpected to be a free maſon, and to demand an explicit anſwer to any queſtion which they might aſk, concerning the adminiſtration of the maſon oath. In the courſe of theſe examinations, the kirk ſeſſion diſcovered, (for they ſeem hitherto to have been ignorant of it) that men who were not architects were admitted into the order. On this account the ſynod, in the year 1757, thought it neceſſary to adopt ſtricter meaſures. They drew up a liſt of queſtions, which they appointed every kirk-ſeſſion to put to thoſe under their charge. Theſe queſtions re-

lated to what they thought were the ceremonies of free maſonry; and thoſe who refuſed to anſwer them were debarred from religious ordinances. The object of theſe proceedings was not, certainly, as is pretended, to make the abettors of the Aſſociate Synod more holy and upright, by detaching them from the fraternity. This could have been effected without that ſpecies of examination which they authoriſed. The church of Rome were contented with diſperſing the fraternity, and receiving its repentant members into their communion. The council of Berne went no farther than aboliſhing the ſociety, and compelling the brethren to renounce their engagements, leſt theſe ſhould be inconſiſtent with the duties of citizens. But a ſynod of Scottiſh diſſenters, who cannot imitate in theſe points the church of Rome and the council of Berne, muſt compel the free maſons of their congregation to give them an account of thoſe myſteries and ceremonies, which they durſt not obtain by regular initiation.

Free Maſonry flouriſhes on the continent.

86. Notwithſtanding theſe perſecutions, free maſonry flouriſhed, and was in the higheſt eſtimation in Great Britain, France, Germany, and ſeveral other kingdoms of Europe. In 1743, it was exported from Scotland to Denmark; and the lodge which was then inſtituted is now the grand lodge of that kingdom. The ſame proſperity has attended the firſt lodge in Sweden, which was erected at Stockholm in 1754, under a patent from Scotland. In 1765, a ſplendid apartment was erected at Marſeilles, for the accommodation of the brethren. It was adorned with the fineſt paintings, repreſenting the moſt intereſting ſcenes that occur in the hiſtory of the Old and New Teſtament, and calculated to remind the ſpectator of his various duties as a man, a ſubject, and a Chriſtian. The repreſentation of Joſeph and his brethren, of the Samaritan and Jew, of Lot and the Angels, muſt have reminded every brother of the beauty of charity and forgiveneſs, which are the firſt principles of maſonry, as they are the firſt duties of man. The picture of Peter and the Apoſtles paying tribute to Cæſar, muſt have recalled to every individual his obligations, as a citizen, to revere and ſupport the conſtituted authorities. And the repreſentation of Job in his misfortunes, lifting up his hands to heaven, muſt have forced upon the minds of the moſt inconſiderate, this important reflection—that fortitude and reſignation to the will of God are the duties of all in diſtreſs, and that the divine bleſſing will ultimately attend thoſe who bear, without murmuring, the chaſtiſements of their father, and preſerve, amidſt the ſevereſt trials, their patience and virtue unimpaired (x). Theſe obſervations, apparently trifling, are important in one reſpect, as they ſhow that the French lodges had not at that time foſtered in their boſom the votaries of ſcepticiſm and diſloyalty. The other lodges in France were at this time numerous and magnificent. The grand lodge contained about twenty offices, which were all filled by noblemen of the higheſt rank. They had provincial grand maſters ſimilar to thoſe of Scotland, and the inſignia and jewels of all thoſe office-bearers, were as rich and ſplendid as the lodges where they aſſembled.

87. In the year 1767, a lodge, under an Engliſh conſtitution was eſtabliſhed at Berlin, under the appellation of *La Royale York*, in honour of the duke of York, who was initiated into the fraternity by that lodge while he was travelling on the continent. In 1768, the free maſons of Germany were authoriſed to hold their aſſemblies, by a charter granted by the king of Pruſſia, the elector of Saxony, and the queen of Hungary and Bohemia, and afterwards by the emperor of Germany himſelf. By another charter from England, in 1769, a lodge was erected at Brunſwick, which, a ſhort time after, received a provincial deputation from England, for ſuperintending the lodges of Lower Saxony. In the year 1773 a compact was entered into between the grand lodge of England, under Lord Petre, and the grand lodge at Berlin, under the prince of Heſſe Darmſtadt, which had a few years before been duly erected into a grand lodge, at a meeting of the maſters and wardens of twelve regular lodges. In this compact it was ſtipulated, that the grand lodge of Berlin ſhould be acknowledged as the grand lodge of the whole empire of Germany, including the dominions of his Pruſſian majeſty; that it ſhould exerciſe no maſonic power out of the empire of Germany, or within the diſtrict under the authority of the grand lodge of Brunſwick; that the electorate of Hanover ſhould be free to both the grand lodges in Germany; and that the contracting parties ſhould unite their efforts to counteract all innovations in maſonry, and particularly the proceedings of a ſet of maſons in Berlin, who, under the denomination of *Stricte Obſervanz*, had annihilated their former conſtitutions, erected themſelves into a grand lodge, and ſanctioned very improper innovations upon the principles and ceremonies of the fraternity. This compact was highly approved of by the king of Pruſſia, who immediately erected the grand lodge of Berlin into a corporate body. In 1777, the king of Pruſſia was protector of all the maſons in Germany. Ferdinand, duke of Brunſwick and Lunenburgh, was grand maſter of all the united lodges in Germany; and the other offices were filled by the moſt able and illuſtrious princes of the empire. Under the auſpices of ſuch diſtinguiſhed perſonages, and the juriſdiction of the grand lodges of Berlin and Brunſwick, free maſonry has flouriſhed to the preſent day in that extenſive empire.

Charity ſchools erected by free maſons.

88. In Germany, Denmark, and Sweden, charity-ſchools were erected by the lodges, for educating the children of free maſons, whoſe poverty debarred them from this advantage. In that which was formed at Brunſwick, they were inſtructed even in claſſical learning, and various branches of the mathematics; and were regularly examined by the duke of Brunſwick, who rewarded the moſt deſerving with ſuitable donations. At Eiſenach ſeveral ſeminaries of this kind were eſtabliſhed. The teachers were endowed with fixed ſalaries; and, in a ſhort time after their inſtitution, they had ſent into the world 700 children, inſtructed in the principles of ſcience, and the doctrines of Chriſtianity. In 1771, an eſtabliſhment of a ſimilar kind was formed at Caſſel, in which the children were maintained and educated till they could provide for themſelves.

(x) For a farther account of this building, ſee Smith's Uſe and Abuſe of Free Maſonry, p. 165.

ſelves. In 1773 the united lodges of Dreſden, Leipſick, and Gorlitz, erected at Frederickſtadt a ſeminary of learning for children of every denomination in the electorate of Saxony. The voluntary ſubſcriptions were ſo numerous that the funds of the inſtitution were ſufficient for its maintenance; and in the ſpace of five years, above 1100 children received a liberal education. In the ſame year, an extenſive workhouſe was erected at Prague in which the children were not only initiated into the firſt principles of learning, but into thoſe branches of the uſeful and fine arts which might qualify them for commercial and agricultural ſituations. It deſerves to be remarked, that the founders of theſe inſtitutions, amid their anxiety for the public proſperity, never neglected the ſpiritual intereſts of the children. They ſaw that early piety is the foundation of all that is uſeful and honourable in life; and that without this, ſpeculative knowledge and practical ſkill are of little avail.—How inconſiſtent are ſuch facts with thoſe fabulous accounts of the German lodges, which have been publiſhed in England by a few party-men.

ee maſon- perſecu- in Por- gal

89. While theſe things were going on in Germany, the brethren in Portugal were expoſed to the perſecution of its bigotted rulers. Major François d'Alincourt, a Frenchman, and Don Oyres de Ornellas Pracao, a Portugueſe nobleman, were in 1766 impriſoned by the governor of Madeira for their attachment to their order. Being afterwards carried to Liſbon, they were confined for fourteen months, till they were releaſed by the generous interceſſion of the brethren in that city. In the following year ſeveral free maſons were confined at Naples, but ſoon liberated by the interceſſion of foreign princes, and the eloquence of an Italian advocate.

90. Notwithſtanding the perſecutions which the fraternity experienced in Holland, free maſonry was flouriſhing in that republic in 1779. At that time a compact was entered into between the grand lodge of Holland, held at the Hague, and that of England. In this compact it was ſtipulated that the grand lodge of Holland ſhould be permitted to erect lodges within her territories, both at home and abroad, and to appoint provincial grand maſters over each diſtrict. In conſequence of this aceſſion of power to the grand lodge of Holland, free maſonry flouriſhed, under its auſpices, in the Dutch ſettlements in India, Africa, and South America.

rigin and ſtory of e illumi- ati.

91. Let us now direct our attention to a new ſecret aſſociation which about this time, aroſe in Germany, and which was imagined to have taken its riſe from free maſonry, and to have planned a diabolical conſpiracy againſt every religious and political eſtabliſhment in Europe. In 1775 the order of the illuminati was founded by Doctor Adam Weiſhaupt, profeſſor of canon law in the univerſity of Ingolſtadt. In this aſſociation ſpeculative opinions were inculcated, which were certainly inconſiſtent with the principles of ſound religion and ſocial order. But that illuminiſm originated from free maſonry; that it brought about the French revolution, or even planned any dangerous conſpiracy, are circumſtances of which the ſhadow of a proof has not yet been adduced. Dr Robiſon indeed confeſſes, that illuminiſm "took its riſe among the free maſons, but was totally different from free maſonry;" and by a deceitful arrangement, he repreſents Weiſhaupt as an active member in the German lodges, before he acquaints his readers that he was the founder of the illuminati, for no other reaſon than to make them believe that Weiſhaupt was a free maſon before he planned his new aſſociation (F). Now the caſe was very different indeed. Barruel himſelf aſſerts, "that it is a fact demonſtrated beyond a doubt, that Weiſhaupt became a maſon in 1777 only; and that two years before this, when he eſtabliſhed illuminiſm, he was totally unacquainted with the myſteries of free maſonry (G)." Here then is an important fact which ſtrikes at the root of all Dr Robiſon's reaſoning againſt free maſonry. Barruel maintains, that Weiſhaupt was not a maſon till two years after the organization of his new inſtitution; and Dr Robiſon allows, that illuminiſm was totally different from free maſonry. The two inſtitutions, therefore, were totally unconnected; for the members of the one were never admitted into the lodges of the other, without being regularly initiated into the myſteries of both. Upon theſe ſimple facts we would arreſt the attention of every reader, and thoſe in particular who have been ſwindled out of their ſenſes, by the united exertions of a prieſt and a philoſopher.

92. After Weiſhaupt had organized his inſtitution, he exerted every nerve to diſſeminate its principles. For this purpoſe he became a free maſon in 1777; and by means of emiſſaries, he attempted to circulate his opinions among the French and German lodges. In theſe attempts indeed, he was ſometimes ſucceſsful. But it ſhould be recollected by thoſe who, on this account, calumniate free maſonry, that the ſame objection may be urged againſt Chriſtianity, becauſe impoſtors have ſometimes gained proſelytes, and perverted the wavering minds of the multitude. Theſe doctrines, however, were not merely circulated by Weiſhaupt in a few of the lodges, and taught at the aſſemblies of the illuminati. They were publiſhed to the world in the moſt faſcinating form, by the French encyclopediſts; and were inculcated in all the eloquence, with which ſome of the moſt celebrated philoſophers on the continent could adorn them. It can only be ſaid of Weiſhaupt, therefore, that he was not juſt ſuch a determined infidel as Voltaire and his aſſociates.—Such is a ſhort, and it is hoped, an impartial view of the origin and progreſs of the illuminati. It may be now proper to attend to the cauſes from which this aſſociation aroſe, and the advantages and diſadvantages which it may have engendered.

Cauſes from which illuminiſm roſe.

93. About the middle of the eighteenth century the literati on the continent were divided into two great parties. The one may be conſidered as ex-jeſuits, or adherents to the catholic ſuperſtition, who were promoters of political and religious deſpotiſm, and inculcated the doctrines of non-reſiſtance and paſſive obedience. The other party was compoſed of men who were friends

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(F) Proofs of a Conſpiracy, Introduction, p. 15. and p. 101.

(G) Memoirs of Jacobiniſm, Part iii. Preliminary Obſervations, p. 15. and p. 12.

Maſonry.

to the reformed religion, enemies of ſuperſtition and fanaticiſm, and ſupporters of the rational doctrine of the infinite perfectibility of the human mind. They were diſguſted with that ſlavery which was impoſed by the deſpotiſm of the continental rulers, and the ſuperſtition of the church of Rome; and many of them entertained opinions adverſe to the Chriſtian religion, and to every exiſting form of government. Between theſe two parties there was a perpetual ſtruggle for power. The ex-jeſuits accuſed their opponents as heretics and promoters of ſedition and infidelity; while the others were conſtantly expoſing the intrigues of prieſts, and the tyranny of deſpots. To this latter claſs belonged Weiſhaupt and his aſſociates, who inſtituted the order of the illuminati for no other purpoſe than to oppoſe thoſe corrupted prieſts, who would have degraded them as Chriſtians, and thoſe tyrannical deſpots who have enſlaved them as citizens. The colliſion of theſe parties was certainly productive of the greateſt advantages. While the Jeſuits reſtrained the inclination of one part of the community, to overrate the dignity of the human mind, and anticipate ideal viſions of religious and political perfection; the illuminati counteracted thoſe gloomy opinions which debaſe the dignity of our nature, which check the energies of the mind, and impoſe the moſt galling yoke of religious and political ſervitude.

94. After the French revolution, which, as Mounier has well ſhown, aroſe from other cauſes than thoſe to which Barruel and Robiſon aſcribe it, the plans of theſe parties were not carried on in Germany ſo ſyſtematically as before; and notwithſtanding the fabrications with which Barruel has calumniated the lodges in that country, free maſonry prevails to his day, reſpected by the moſt virtuous and ſcientific members of the community, and patronized by the moſt diſtinguiſhed princes of the empire.

Requiſite qualifications of a maſon in Germany.

95. In Germany the qualifications for a free maſon are great and numerous. No perſon is initiated into the order without the conſent of every member of the lodge; and it frequently happens, that a German even is excluded by a ſingle diſſenting voice. On this account the lodges of that country are filled with perſons of the firſt rank and reſpectability; and every thing is conducted with the greateſt decorum and ſolemnity. As maſonry is there held in the higheſt eſtimation, an Engliſhman will obtain an eaſier introduction to the chief nobility and literati of Germany in a maſon lodge than in any other place; and will never repent of having been initiated into the order in his native country (H).

96. After the publication of the works of Barruel and Robiſon, the progreſs of free maſonry in Britain was retarded by an act of parliament in 1799 for the ſuppreſſion of ſeditious ſocieties, by which the fraternity were virtually prohibited from erecting new lodges in the kingdom. But this act was not prompted by the calumnies of theſe writers. It became neceſſary from the political condition of the kingdom; and the exceptions which it contained in favour of free maſons, completely prove that government never credited the reports of theſe ſlanders, but placed the moſt implicit confidence in the loyalty and prudence of Britiſh maſons. The private characters, indeed, as well as the public ſituations of thoſe individuals who are now grand maſters of the order, are a ſufficient pledge to the legiſlature and the uninitiated public, that free maſonry will retrieve in theſe kingdoms its ancient purity and ſimplicity, and that it will ever continue to be the foe of deſpotiſm and oppreſſion, the enemy of ſuperſtition and fanaticiſm, the promoter of civilization and good order, and the friend of true benevolence and unaffected piety.

Maſora.

MASORA, a term in the Jewiſh theology, ſignifying a work on the Bible, performed by ſeveral learned rabbins, to ſecure it from any alterations which might otherwiſe happen.

Their work regards merely the letter of the Hebrew text, in which they have, firſt, fixed the true reading by vowels and accents: they have, ſecondly, numbered not only the chapters and ſections, but the verſes, words, and letters of the text: and they find in the Pentateuch 5245 verſes, and in the whole Bible 23,206. The maſora is called, by the Jews, the *hedge or fence of the law*, becauſe this enumeration of the verſes, &c. is a means of preſerving it from being corrupted and altered. They have, thirdly, marked whatever irregularities occur in any of the letters of the Hebrew text; ſuch as the different ſize of the letters, their various poſitions and inverſions, &c. and they have been fruitful in finding out reaſons for theſe irregularities and myſteries in them. They are, fourthly, ſuppoſed to be the authors of the Keri and Chetibh, or the marginal corrections of the text in our Hebrew Bibles.

The text of the ſacred books, it is to be obſerved, was originally written without any breaks or diviſions into chapters or verſes, or even into words; ſo that a whole book, in the ancient manner, was but one continued word; of this kind we have ſtill ſeveral ancient manuſcripts, both Greek and Latin. In regard, therefore, the ſacred writings had undergone an infinite number of alterations, whence various readings had ariſen, and the original was become much mangled and diſguiſed, the Jews had recourſe to a canon, which they judged infallible, to fix and aſcertain the reading of the Hebrew text; and this rule they call *maſora*, "tradition," from מסר, *tradidit*, as if this critique were nothing but a tradition which they had received from their forefathers. Accordingly they ſay, that when God gave the law to Moſes at Mount Sinai, he taught him, firſt, the true reading of it; and, ſecondly, its true interpretation; and that both theſe were handed down by oral tradition, from generation to generation, till at length they were committed to writing. The former of theſe, viz. the true reading, is the ſubject of the maſora; the latter, or true interpretation, that of the miſhna and gemara.

According to Elias Levita, they were the Jews of a famous ſchool at Tiberias, about 500 years after Chriſt, who compoſed, or at leaſt began, the maſora; whence

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(H) Dr Render's Tour through Germany, Introduction to vol. i. p. 30 and 33. Dr Render maintains, that free maſonry has greatly improved the manners and diſpoſition of the Germans. See vol. ii. p. 200 *Note*.

whence they are called *maſoretes*, and *maſoretic doctors*. Aben Ezra makes them the authors of the points and accents in the Hebrew text, as we now find it; and which ſerve for vowels.

The age of the maſorites has been much diſputed. Archbiſhop Uſher places them before Jerome; Capel, at the end of the fifth century; Father Morin, in the tenth century. Baſnage ſays, that they were not a ſociety, but a ſucceſſion of men; and that the maſora is the work of many grammarians, who, without aſſociating and communicating their notions, compoſed this collection of criticiſms on the Hebrew text. It is urged that there were maſorites from the time of Ezra and the men of the great ſynagogue, to about the year of Chriſt 1030: and that Ben Aſher and Ben Naphtali, who were the beſt of the profeſſion, and who, according to Baſnage, were the inventors of the maſora, flouriſhed at this time. Each of theſe publiſhed a copy of the whole Hebrew text, as correct, ſays Dr Prideaux, as they could make it. The eaſtern Jews have followed that of Ben Naphtali, and the weſtern that of Ben Aſher; and all that has been done ſince is to copy after them, without making any more corrections or maſoretical criticiſms.

The Arabs have done the ſame thing by their Koran that the maſorites have done by the Bible; nor do the Jews deny their having borrowed this expedient from the Arabs, who firſt put it in practice in the ſeventh century.

There is a great and little Maſora printed at Venice and at Baſil, with the Hebrew text in a different character. Bxutorf has written a maſoretic commentary, which he calls *Tiberius.*

MASQUE, or MASK, a cover for the face, contrived with apertures for the eyes and mouth; originally worn chiefly by women of condition, either to preſerve their complexion from the weather, or out of modeſty to prevent their being known. Poppæa, wife of Nero, is ſaid to be the firſt inventor of the *maſque;* which ſhe did to guard her complexion from the ſun and weather, as being the moſt delicate woman, with regard to her perſon, that has been known.

Theatrical maſques were in common uſe both among the Greeks and Romans: Suidas and Athenæas aſcribe the invention of them to the poet Chœrilus, a contemporary of Theſpis: Horace attributes them to Æſchylus; but Ariſtotle informs us, that the real inventor, and conſequently the time of their firſt introduction and uſe, were unknown. Brantome obſerves, that the common uſe of modern maſques was not introduced till towards the end of the ſixteenth century.

MASQUE is alſo uſed to ſignify any thing uſed to cover the face, and prevent a perſon's being known. The penitents of Lyons and Avignon hide their faces with large white veils, which ſerve them for maſques.

The Iron Masque (Maſque de Fer), or *Man with the Iron Maſque*, a remarkable perſonage ſo denominated, who exiſted as a ſtate priſoner in France during the latter part of the 17th century. As the circumſtances of this perſon form a hiſtorical problem which has occaſioned much inquiry, and given riſe to many conjectures, as well as of late, in conſequence of the deſtruction of the Baſtile, excited in a particular manner the curioſity of the public, it ſhall be endeavoured to condenſe in this article the ſubſtance of every thing material that has been publiſhed on the ſubject. We ſhall firſt relate ſuch particulars concerning this extraordinary priſoner as appear to be well authenticated; and ſhall then mention the different conjectures that have been entertained with regard to his real quality, and the cauſes of his confinement.

I. The authenticated particulars concerning the *Iron Maſque* are as follows: A few months after the death of Cardinal Mazarine, there arrived at the iſle of Sainte Marguerite, in the ſea of Provence, a young priſoner whoſe appearance was peculiarly attracting: his perſon was above the middle ſize, and elegantly formed; his mien and deportment were noble, and his manners graceful; and even the ſound of his voice, it is ſaid, had in it ſomething uncommonly intereſting. On the road he conſtantly wore a maſque made with iron ſprings, to enable him to eat without taking it off. It was at firſt believed that this maſque was made entirely with iron; whence he acquired the name of "the Man with the iron maſk." His attendants had received orders to deſpatch him if he attempted to take off his maſque or diſcover himſelf. He had been firſt confined at Pignerol, under the care of the governor M. de St Mars; and upon being ſent from thence to Sainte Marguerite, he was accompanied thither by the ſame perſon, who continued to have the charge of him. He was always treated with the moſt marked reſpect: he was ſerved conſtantly in plate; and the governor himſelf placed his diſhes on the table, retiring immediately after and locking the door behind him. He *tu-to'yoit* (thee'd and thou'd) the governor; who, on the other hand, behaved to him in the moſt reſpectful manner, and never wore his hat before him, nor ſat down in his preſence unleſs he was deſired. The marquis de Louvoiſis, who went to ſee him at St Marguerite, ſpoke to him ſtanding, and with that kind of attention which denotes high reſpect.

During his reſidence here, he attempted twice, in an indirect manner, to make himſelf known. One day he wrote ſomething with his knife on a plate, and threw it out of his window towards a boat that was drawn on ſhore near the foot of the tower. A fiſherman picked it up and carried it to the governor. M. de St Mars was alarmed at the ſight; and aſked the man with great anxiety, whether he could read, and whether any one elſe had ſeen the plate. The man anſwered, that he could not read, that he had but juſt found the plate, and that no one elſe had ſeen it. He was, however, confined till the governor was well aſſured of the truth of his aſſertions.—Another attempt to diſcover himſelf proved equally unſucceſsful. A young man who lived in the iſle, one day perceived ſomething floating under the priſoner's window; and on picking it up, he diſcovered it to be a very fine ſhirt written all over. He carried it immediately to the governor; who having looked at ſome parts of the writing, aſked the lad, with ſome appearance of anxiety, if he had not had the curioſity to read it. He proteſted repeatedly that he had not; but two days afterwards he was found dead in his bed.

The *Maſque de Fer* remained in this iſle till the year 1698, when M. St Mars being promoted to the government of the Baſtile, conducted his priſoner to that fortreſs. In his way thither, he ſtopt with him at his eſtate near Palteau. The Maſque arrived there in a litter, Maſque. litter, ſurrounded by a numerous guard on horſeback. M. de St Mars ate at the ſame table with him all the time they reſided at Palteau; but the latter was always placed with his back towards the windows; and the peaſants, who came to pay their compliments to their maſter, and whoſe curioſity kept them conſtantly on the watch, obſerved that M. de St Mars always ſat oppoſite to him with two piſtols by the ſide of his plate. They were waited on by one ſervant only, who brought in and carried out the diſhes, always carefully ſhutting the doors behind him in going out and returning. The priſoner was always maſked, even when he paſſed through the court; but the people ſaw his teeth and lips, and obſerved that his hair was gray.—The governor ſlept in the ſame room with him, in a ſecond bed that was placed in it on that occaſion. In the courſe of their journey, the Iron Maſk was, one day heard to aſk his keeper whether the king had any deſign on his life? "No, prince," he replied; "provided that you quietly allow yourſelf to be conducted, your life is perfectly ſecure."

The ſtranger was accommodated as well as it was poſſible to be in the Baſtile. An apartment had been prepared for him by order of the governor before his arrival, fitted up in the moſt convenient ſtyle; and every thing he expreſſed a deſire for was inſtantly procured him. His table was the beſt that could be provided; and he was ordered to be ſupplied with as rich clothes as he deſired: but his chief taſte in this laſt particular was for lace, and for linen remarkably fine. It appears that he was allowed the uſe of ſuch books as he deſired, and that he ſpent much of his time in reading. He alſo amuſed himſelf with playing upon the guitar. He had the liberty of going to maſs; but was then ſtrictly forbid to ſpeak or uncover his face: orders were even given to the ſoldiers to fire upon him if he attempted either; and their pieces were always pointed towards him as he paſſed through the court. When he had occaſion to ſee a ſurgeon or a phyſician, he was obliged, under pain of death, conſtantly to wear his maſk. An old phyſician of the Baſtile, who had often attended him when he was indiſpoſed, ſaid, that he never ſaw his face, though he had frequently examined his tongue, and different parts of his body; that there was ſomething uncommonly intereſting in the ſound of his voice; and that he never complained of his confinement, nor let fall from him any hint by which it might be gueſſed who he was. It is ſaid that he often paſſed the night in walking up and down his room.

This unfortunate prince died on the 19th of November 1703, after a ſhort illneſs; and was interred next day in the burying-place of the pariſh of St Paul. The expence of his funeral amounted only to forty livres. The name given him was *Marchiali:* and even his age, as well as his real name, it ſeemed of importance to conceal; for in the regiſter made of his funeral, it was mentioned that he was about forty years old; though he had told his apothecary, ſome time before his death, that he thought he muſt be ſixty.—It is a well-known fact, that immediately after the priſoner's death, his apparel, linen, clothes, mattreſſes, and in ſhort every thing that had been uſed by him, were burnt; that the walls of his room were ſcraped, the floor taken up, evidently from the apprehenſion that he might have found means of writing any thing that would have diſcovered who he was. Nay, such was the fear of his having left a letter or any mark which might lead to a diſcovery, that his plate was melted down; the glaſs was taken out of the window of his room and pounded to duſt; the wainſcot-frame and doors burnt; and the ceiling of the room, and the plaſter of the inſide of the chimney, taken down. Several perſons have affirmed, that the body was buried without a head; and Monſieur de Saint Foix informs us*, that "a gentleman having bribed the ſexton, had the body taken up in the night, and found a ſtone inſtead of the head."

The reſult of theſe extraordinary accounts is, that the Iron Maſque was not only a perſon of high birth, but muſt have been of great conſequence; and that his being concealed was of the utmoſt importance to the king and miniſtry. We come now, therefore, to notice,

II. The opinions and conjectures that have been formed concerning the real name and condition of this remarkable perſonage. Some have pretended that he was the duke of Beaufort; others, that he was the count de Vermandois, natural ſon to Louis XIV. by the ducheſs de la Valliere. Some maintain him to have been the duke of Monmouth, natural ſon of Charles II. of England by Lucy Walters; and others ſay, that he was Gerolami Magni, miniſter to the duke of Modena.

Beſides theſe conjectures, none of which poſſeſſes ſufficient probability to entitle them to conſideration, a fifth has been advanced; namely, That the Iron Maſque was a ſon of Anne of Auſtria, queen to Louis XIII. and conſequently that he was a brother of Louis XIV.; but whether a baſtard brother, a brother-german, or a half-brother, is a queſtion that has given riſe to three ſeveral opinions, which we ſhall ſtate in the order of time in which the reſpective tranſactions to which they allude happened.

1. The firſt opinion is, that the queen proved with child at a time when it was evident it could not have been by her huſband, who, for ſome months before, had never been with her in private. The ſuppoſed father of this child is ſaid by ſome to have been the duke of Buckingham, who came to France in May 1625, to conduct the Princeſs Henrietta, wife of Charles I. to England. The private letters and memoirs of thoſe times ſpeak very ſuſpiciouſly of the queen and Buckingham: his behaviour at Amiens, whither the queen and queen-mother accompanied the princeſs in her way to Boulogne, *occaſioned much whiſpering:* notwithſtanding the pains that have been taken by La Porte in his *Memoires* to excuſe his miſtreſs, it appears that the king, on this occaſion, was extremely offended at her, and that it required all the influence and addreſs of the queen-mother to effect a reconciliation. It is ſaid, that this child was privately brought up in the country; that when Mazarine became a favourite, he was intruſted with the care of him; and that Louis XIV. having diſcovered the ſecret on the death of the cardinal, thought it neceſſary to confine him in the manner that has been related.

But it may be obſerved. that this ſecret could ſcarcely have eſcaped the vigilance of the cardinal de Richlieu;

Hiſt. of t. Baſtile, n° 6. p. 3.

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* In his *Hi riques.*

Richlieu; and it is not improbable, that a miniſter ſo little ſcrupulous, if inclined to ſave the honour of a queen, would have removed a child, who, if he lived, might have been made uſe of to diſturb the tranquillity of the kingdom. After this ſuppoſed birth, the queen had frequent quarrels with the king, and what was more dangerous, with the cardinal; who even uſed every means in his power to inquire into her moſt private tranſactions. It was on a memorable occaſion of this kind, that her ſervant La Porte was thrown into the Baſtile; and it can ſcarcely be imagined ſhe would have had the firmneſs ſhe then diſplayed, while conſcious of ſo much guilt, and under the riſk of having it diſcovered. The priſoner with the maſque appears, by ſeveral accounts, to have been a youth of a handſome figure in the year 1661; and in 1703, when he died, to have been above ſixty; but had he been a ſon of Buckingham, he would have been about thirty-ſix in 1661, when he could not be ſaid to have been a youth; and in November 1703, about ſeventy-eight.

2. The ſecond opinion is, that he was the twin brother of Louis XIV. born ſome hours after him. This firſt appeared in a ſhort anonymous work publiſhed without date, and without the name of place or printer. It is therein ſaid, "Louis XIV. was born at St Germains en Laye, on the 5th of September 1638, about noon; and the illuſtrious priſoner, known by the appellation of the *Iron Maſque*, was born the ſame day, while Louis XIII. was at ſupper. The king and the cardinal, fearing that the pretenſions of a twin brother might one day be employed to renew thoſe civil wars with which France had been ſo often afflicted, cautiouſly concealed his birth, and ſent him away to be brought up privately. Having but an imperfect knowledge of the circumſtances that followed, I ſhall ſay nothing more, for fear of committing errors; but I firmly believe the fact I have mentioned; and time will probably prove to my reader, that I have ground for what I have advanced."

This opinion has been more noticed ſince the publication of a work called *Memoires du Marechal Duc de Richlieu*, written by the abbé Soulavie; concerning which it may be proper to premiſe, that the preſent duke of Richlieu, ſon of the marechal, diſavows this work, while the abbé Soulavie, who had been employed by the marechal, inſiſts on the authenticity of his papers (A). He informs us, that the duke of Richlieu was the lover of Mademoiſelle de Valois, daughter of the regent duke of Orleans, and afterwards ducheſs of Modena, who in return was paſſionately fond of him; that the regent had ſomething more than a paternal affection for his daughter; and that, though ſhe held his ſentiments in abhorrence, the duke of Richlieu made uſe of her influence with her father to diſcover the ſecret of the priſoner with the maſque; that the regent, who had always obſerved the moſt profound ſilence on this ſubject, was at laſt perſuaded to intruſt her with a manuſcript, which ſhe immediately ſent to her lover, who took a copy of it. This manuſcript is ſuppoſed to have been written by a gentleman on his deathbed, who had been the governor of the priſoner. The following is an extract of it, from what the abbé Soulavie has told us.

"The birth of the priſoner happened in the evening of the 5th of September 1638, in preſence of the chancellor, the biſhop of Meaux, the author of the manuſcript, a midwife named Peronéte, and a ſieur Honorat. This circumſtance greatly diſturbed the king's mind; he obſerved, that the Salique law had made no proviſion for ſuch a caſe; and that it was even the opinion of ſome, that the laſt born was the firſt conceived, and therefore had a prior right to the other. By the advice of Cardinal de Richlieu, it was therefore reſolved to conceal his birth, but to preſerve his life, in caſe by the death of his brother it ſhould be neceſſary to avow him. A declaration was drawn up, and ſigned and ſworn to by all preſent, in which every circumſtance was mentioned, and ſeveral marks on his body deſcribed. This document being ſealed by the chancellor with the royal ſeal, was delivered to the king; and all were commanded and took an oath never to ſpeak on the ſubject, not even in private and among themſelves. The child was delivered to the care of Madame Peronéte the midwife, to be under the direction of Cardinal de Richlieu, at whoſe death the charge devolved to Cardinal de Mazarine. Mazarine appointed the author of the manuſcript his governor, and intruſted to him the care of his education. But as the priſoner was extremely attached to Madame Peronéte, and ſhe equally ſo to him, ſhe remained with him till her death. His governor carried him to his houſe in Burgundy, where he paid the greateſt attention to his education.

"As the priſoner grew up, he became impatient to diſcover his birth, and often importuned his governor on that ſubject. His curioſity had been rouſed by obſerving that meſſengers from the court frequently arrived at the houſe: and a box, containing letters from the queen and the cardinal, having one day been inadvertently left out, he opened it, and ſaw enough to gueſs at the ſecret. From that time he became thoughtful and melancholy; 'which (ſays the author) I could not then account for. He ſhortly after aſked me to get him a portrait of the late and preſent king; but I put him off by ſaying that I could not procure any that were good. He then deſired me to let him go to Dijon; which I have known ſince was with an intention of ſeeing a portrait of the king there, and of going ſecretly to St John de Lus, where the court then was on occaſion of the marriage with the infanta. He was beautiful; and love helped him to accompliſh his wiſhes. He had captivated the affections of a young houſekeeper, who procured him a portrait of the king. It might have ſerved for either of the brothers; and the diſcovery put him into ſo violent a paſſion, that he immediately came to me with the portrait in his hand, ſaying, *Voila mon frere, et voila qui je ſuis*, ſhowing me at the ſame time a letter of the cardinal de Mazarine that he had taken out of the box.' Upon this diſcovery his governor immediately ſent an expreſs to court

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(A) A letter from the duke of Richlieu, and anſwer from the abbé Soulavie, appeared in the Journal de Paris.

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible].

[illegible] "I have [illegible] [illegible] [illegible]: I am now [illegible] to [illegible] my [illegible]; and for the peace of my soul I cannot help make this declaration, which may point out to him the means of freeing himſelf from his preſent ignominious ſituation, in caſe the king his brother ſhould die without children. Can an extorted oath compel me to obſerve ſecrecy on a thing ſo incredible, but which ought to be left on record to poſterity."

3. The third opinion is, that he was a ſon of the queen by the cardinal de Mazarine, born about a year after the death of her huſband Louis XIII.; that he was brought up ſecretly; and that ſoon after the death of the cardinal, which happened on the 9th of March 1661, he was ſent to Pignerol. To this account Father Griffet * objects, "that it was needleſs to maſque a face that was unknown; and therefore that this opinion does not merit diſcuſſion." But in anſwer it has been obſerved, That the priſoner might ſtrongly reſemble Louis XIV. which would be a ſufficient reaſon to have him maſked. This opinion is ſuppoſed to have been that entertained by Voltaire, who aſſerts his thorough knowledge of the ſecret, though he declined being altogether explicit. The abbé Soulavie, author of Memoirs of the Marechal de Richlieu, ſpeaking on this ſubject, ſays, "That he once obſerved to the marechal, that he certainly had the means of being informed who the priſoner was; that it even ſeemed that he had told Voltaire, who durſt not venture to publiſh the ſecret; and that he at laſt aſked him, whether he was not the elder brother of Louis XIV. born without the knowledge of Louis XIII.? That the marechal ſeemed embarraſſed, but afterwards ſaid, that he was neither the baſtard brother of Louis XIV. nor the duke of Monmouth, nor the count of Vermandois, nor the duke of Beaufort, as different authors had advanced; that their conjectures were nothing but reveries: but added, that they however had related many circumſtances that were true; that in fact the order was given to put the priſoner to death if he diſcovered himſelf; and that he finiſhed the converſation by ſaying, All I can tell you on the ſubject is, that the priſoner was not of ſuch conſequence when he died at the beginning of the preſent century as he had been at the beginning of the reign of Louis XIV. and that he was ſhut up for important reaſons of ſtate." The abbé Soulavie tells us, that he wrote down what had been ſaid, and gave it to the marechal to read, who corrected ſome expreſſions. The abbé having propoſed ſome further queſtions, he anſwered. "Read what Voltaire publiſhed laſt on the ſubject of the priſoner with the maſque, eſpecially at the end, and reflect on it."—The paſſage of Voltaire alluded to is as follows:

"The *man with the maſque* (ſays he), is an enigma of which every one would gueſs the meaning. Some have ſaid that it was the duke of Beaufort; but the duke of Beaufort was killed by the Turks in the defence of Candy in 1669, and the priſoner with the maſque was at Pignerol in 1661. Beſides, how could the duke of Beaufort have been arreſted in the midſt of his army, and brought to France, without any one knowing it? and why confine him? and why that maſque?—Others have dreamed that he was the count de Vermandois, natural ſon of Louis XIV. who died publicly at the army in 1683 of the ſmallpox, and was buried at the little town of Aire and not Arras; in which Father Griffet was miſtaken, but in which to be ſure there is no great harm. Others have imagined, that it was the duke of Monmouth, who was beheaded publicly in London in the year 1685. But for this he muſt have riſen again from the dead, and he muſt have changed the order of time, and placed the year 1662 in the room of the year 1685. King James, who never forgave any one, and who on that account deſerved all that happened to him, muſt have pardoned the duke of Monmouth, and got another to die in his ſtead, who perfectly reſembled him. This Soſia muſt firſt have been found, and then he muſt have had the goodneſs to let his head be cut off in public, to ſave the duke of Monmouth. It was neceſſary that all England ſhould be miſtaken; and that King James ſhould beg of Louis XIV. to be ſo obliging as to be his gaoler; that Louis XIV. after having ſhown this trifling piece of civility to King James ſhould not have been wanting in the ſame attention to his friend King William and to Queen Anne (with both of whom he was engaged in war), and to pleaſe them, retained the dignity of gaoler, with which James had honoured him.

"All theſe illuſions being diſſipated, it then remains to know who this priſoner was, and at what age he died. It is clear, that if he was not permitted to croſs the court of the Baſtile, or to ſpeak to his phyſician, except covered with a maſque, it muſt have been from the apprehenſion that his features and countenance might have diſcovered ſome reſemblance. He could ſhow his tongue, but not his face. He ſaid himſelf to the apothecary of the Baſtile, a few days before his death, that he believed he was about 60. Mr Marſoban, who was ſon-in-law to this apothecary, and ſurgeon to the marechal de Richlieu, and afterwards to the regent duke of Orleans, told me this frequently. Why give him an *ITALIAN* name?—They always called him *Marchiali*. He who writes this article perhaps knows more than Father Griffet, but he will ſay nothing farther."

This opinion has been lately reſumed, illuſtrated, and enforced, by M. de Saint Mihiel, in a work entitled *Le Veritable Homme*, &c. "The real Man with the Iron Maſque." The author, in ſupport of his idea, attempts to prove that Anne of Auſtria and Cardinal Mazarine were married. This, ſays he, the ducheſs of Orleans aſſures us of in three of her letters. In the firſt, dated Sept. 13. 1713, ſhe expreſſes herſelf as follows: "Old Beauvais, who was firſt lady of the bedchamber to the queen dowager, was acquainted with the ſecret of the ridiculous marriage; this rendered it neceſſary for the queen to do every thing that her confidant wiſhed; and this circumſtance has given riſen in this country to an extenſion of the rights of firſt ladies of the bedchamber." In the ſecond of theſe letters, dated Nov. 2. 1717, ſhe ſays, "The queen-mother, widow of Louis XIII. did worſe than love Cardinal Mazarine: ſhe married him, for he was not

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* Traité des preuves de l'Hiſtoire. p. 310.

aſque. a prieſt: he was not even in orders; and who could have hindered her? He was moſt horribly tired of the good queen-mother, and lived on very bad terms with her, which is the reward that people deſerve for entering into ſuch marriages." In her third letter, dated July 2. 1719, ſpeaking of the queen, the ducheſs ſays, "She was perfectly eaſy reſpecting Cardinal Mazarine; he was not a prieſt, and therefore nothing could prevent their being married. The ſecret paſſage through which the cardinal went every evening to the queen's apartment is ſtill to be ſeen at the Palais Royal." Among other proofs beſides the above, which M. de St Mihiel brings to ſubſtantiate this marriage, he obſerves, that Mazarine held all councils of ſtate in his apartment whilſt he was ſhaving or dreſſing; that he never permitted any perſon to ſit down in his preſence, not even the chancellor nor marſhal de Villeroi; and that while they were deliberating with him on ſtate affairs, he would be often playing with his monkey or linnet. What man (continues the author) would have ſubjected to ſuch humiliations a chancellor, who holds the firſt office in the kingdom ſince that of conſtable has been ſuppreſſed, and a marſhal who was governor to the king, had he not been in reality a ſovereign himſelf, in virtue of his being huſband to the queen-regent? He therefore concludes, that the man with the iron maſque was ſon to Anne of Auſtria and Cardinal Mazarine; and endeavours to juſtify this aſſertion by a variety of conjectural proofs. Of ſome of theſe we ſhall give a ſhort ſketch:—

1. No prince, or perſon of any conſideration, after the year 1644, at which time the man with the iron maſque was born, until the time when his exiſtence was known, diſappeared in France. This perſonage, therefore, was not a prince or great lord of France known at that time.

2. The man with the iron maſque was not a foreigner; for foreigners, even of the higheſt diſtinction, did not at that period ſtudy the French language in ſuch a manner as to attain ſo great perfection in it as to paſs for Frenchmen. If this priſoner had ſpoken with the leaſt foreign accent, the officers, phyſicians, ſurgeons, apothecaries, confeſſors, and others employed in the priſons where he was, and eſpecially the priſoners with whom he converſed at St Margaret, would not have failed to diſcover it. From all this M. de St Mihiel infers that he muſt have been a Frenchman.

3. The exiſtence of the man with the iron maſque has been known for upwards of 90 years. Had any perſon of high rank diſappeared at an anterior period, his friends, relations, or acquaintances, would not have failed to claim him, or at leaſt to ſuppoſe that he was the man concealed by this maſque. But no one diſappeared, nor was any one claimed: the man with the iron maſque was therefore a perſon unknown.

4. This man was not torn away from ſociety on account of any criminal action; for when he was arreſted, it was foreſeen that he would cauſe much embarraſſment, and occaſion great expences. He was therefore not a criminal, elſe means would have been purſued to get rid of him; and conſequently all the importance of his being concealed was attached ſolely to his perſon.

5. This ſtranger muſt have been a perſon of very high birth; for the governor of the priſon, St Mars, behaved always to him with the greateſt reſpect.

6. Louis XIII. played on the guitar; Louis XIV. did the ſame in a very maſterly manner; and the man with the iron maſque played alſo on that inſtrument: which gives us reaſon to believe that his education was directed by the ſame perſons who had preſided over that of Louis XIV. and who appear to have been the particular choice of Anne of Auſtria.

7. This ſtranger died on the 19th of November 1703; and a few days before his death, he told the apothecary of the Baſtile, that he believed he was about 60 years of age. Suppoſing that he was then 59 and a half, he muſt have been born towards the end of May 1644; and if he was 60 wanting three months, he muſt have been born in the end of Auguſt, or the beginning of September, of the ſame year; a period when the royal authority was in the hands of Anne of Auſtria, but in reality exerciſed more by Mazarine than by her. "I have already proved (continues the author), that from the firſt day of the regency of Anne of Auſtria, the greateſt friendſhip, and even intimacy, ſubſiſted between this princeſs and the cardinal; that theſe ſentiments were changed into a mutual love; and that they were afterwards united by the bonds of marriage. They might, therefore, well have a ſon about the month of September 1644, as Louis XIII. had been then dead more than 15 months, having died on the 15th of May the year preceding. But nothing of what I have related, or of what has been written, and acknowledged as fact, reſpecting the man with the iron maſque, can be applied, except to a ſon of Mazarine and Anne of Auſtria. The man with the iron maſque was indebted, therefore, for his exiſtence to Cardinal Mazarine and the regent widow of Louis XIII."—To account for the manner in which the queen was able to conceal her pregnancy and delivery, Madame de Motteville is quoted; who relates, under the year 1644, that Anne of Auſtria quitted the Louvre, becauſe her apartments there diſpleaſed her: that ſhe went to reſide at the Palais Royal, which Richlieu, when he died, bequeathed to the deceaſed king: that when ſhe firſt occupied this lodging, *ſhe was dreadfully afflicted with the jaundice*: that the phyſicians aſcribed this diſorder to her dejection and application to buſineſs, which gave her much embarraſſment: but that being cured of her melancholy, as well as of her malady, ſhe reſolved to think only of enjoying tranquillity; which ſhe did, by communicating to her miniſter the burden of public affairs. On this quotation, M. de St Mihiel aſks, "Is it not very ſingular, that the queen, who during the 29 years of her former wedded ſtate, had always reſided in the Louvre, eſpecially from 1626, when Louis XIII. ceaſed to cohabit with her, until their reunion, which took place in the beginning of December 1637, ſhould have quitted it preciſely in 1644, becauſe ſhe was diſpleaſed with her apartments? How happened it that her apartments diſpleaſed her this year, and neither ſooner nor later? She might undoubtedly have had any kind of furniture there which ſhe deſired, and every alteration made according to her wiſhes, as ſhe was then abſolute miſtreſs: but the cauſe of her determination is plain: the apartments of the Palais Royal, which front

a garden, were much more convenient for her to be delivered in ſecret."

8. As it is neceſſary that ſome name ſhould be given to every man, in order to diſtinguiſh him from another, that of *Marchiali* was given to the man with the iron maſque: a name which evidently ſhows, that it had been invented by an Italian. [Cardinal Mazarine was a native of Piſcina in the Abruzzo.]

9. Anne of Auſtria was remarkably delicate reſpecting every thing that touched her perſon. It was with great difficulty that cambric could be found fine enough to make ſhifts and ſheets for her. Cardinal Mazarine once rallying her on this ſubject, ſaid, *That if ſhe ſhould be damned, her puniſhment in hell would be to ſleep in Holland ſheets.* The predominant taſte of the man with the iron maſque, was to have lace and linen of the moſt extraordinary fineneſs. "Who (ſays the author) does not perceive, in this ſimilarity of taſtes, the maternal tenderneſs of Anne of Auſtria, who would have thought her ſon a great ſufferer had he not been indulged with fine linen?"

"Louis XIII. (continues M. de St Mihiel) was a huſband of a gloomy diſpoſition, and an enemy to pleaſure: while the queen, on the contrary, was fond of ſocial life; and introduced at the court of France, eſpecially after ſhe became free, that eaſe and politeneſs which diſtinguiſhed it under Louis XIV. from all the other courts of Europe. Louis XIII. had alſo a diſagreeable countenance, and a breath ſo offenſive, that it was a puniſhment for Richlieu to remain near him. It is clear, therefore, that ſhe could not be much pleaſed with ſuch a huſband. When ſhe became regent of the kingdom by the king's death, which happened on the 14th of May 1643, as ſhe had not enjoyed that happineſs which ariſes from a cloſe union of hearts, it will not appear extraordinary that ſhe ſhould indulge the affection ſhe entertained for Cardinal Mazarine, and that ſhe ſhould marry him. Every circumſtance that could tend to favour ſuch a marriage will be found united in her ſituation. She was at a diſtance from her family; abſolute miſtreſs of all her actions; and had, beſides, a heart formed for love. Mazarine, though a cardinal, had never entered into orders; he gave out that he was deſcended from a great family; he was handſome and well made; he was of a mild, inſinuating diſpoſition, and remarkably engaging in converſation; and his office, as prime miniſter, afforded him every opportunity of viſiting and converſing with the queen whenever he thought proper. Is it, therefore, ſo very aſtoniſhing, that, with ſo many advantages he was able to captivate the queen ſo far as to induce her to marry him? Such a marriage was not, indeed, according to the uſual courſe of things. Yet it was not without many precedents, particularly among ſovereigns of the other ſex, who had given their hands to perſons of inferior rank. Thus Chriſtian IV. of Denmark eſpouſed Chriſtina Monck; Frederick IV. eſpouſed Mademoiſelle Rewentlaw; James II. heir to the throne of England, married the daughter of a counſellor; Peter the Great raiſed to the throne Catharine I. the daughter of a poor villager, yet perhaps the moſt accompliſhed woman at that time between the Viſtula and the Pole; and Louis XIV. eſpouſed the widow of a poet, but a woman poſſeſſed of the moſt extraordinary merit. As the women, however, are not forgiven ſo readily as the men for entering into ſuch marriages, Anne of Auſtria kept hers a ſecret from this motive, and becauſe ſhe would have been in danger of loſing the regency of the kingdom had it been known."

The reaſoning of M. de St Mihiel is both ingenious and plauſible; though the probability of the account is ſomewhat diminiſhed by conſidering what muſt have been the queen's age at this period, after ſhe had been Louis's wife for 29 years before his death.—The account immediately preceding, without this objection, ſeems abundantly credible. But, whether, upon the whole, either of them can be received as deciſive, or whether the myſtery of the iron maſque remains ſtill to be unravelled, we muſt leave to the reader to determine.

MASQUE, in *Architecture*, is applied to certain pieces of ſculpture, repreſenting ſome hideous forms, groteſque, or ſatyrs faces, &c. uſed to fill up and adorn vacant places, as in friezes, the pannels of doors, keys of arches, &c. but particularly in grottos.

MASQUERADE, or MASCARADE, an aſſembly of perſons maſqued or diſguiſed, meeting to dance and divert themſelves. This was much in uſe with us, and has been long a very common practice abroad, eſpecially in carnival time.

The word comes from the Italian *maſcarata*, and that from the Arabic *maſcara*, which ſignifies "raillery, buffoonery." Granacci, who died in 1543, is ſaid to have been the firſt inventor of maſquerades.

MASRAKITHA, a pneumatic inſtrument of muſic among the ancient Hebrews, compoſed of pipes of various ſizes, fitted into a kind of wooden cheſt, open at the top, and ſtopped at the bottom with wood covered with a ſkin. Wind was conveyed to it from the lips, by means of a pipe fixed to the cheſt: the pipes were of lengths muſically proportioned to each other, and the melody was varied at pleaſure, by ſtopping and unſtopping with the fingers the apertures at the upper extremity. See Plate CCXCVIII.

MASS, in *Mechanics*, the matter of any body cohering with it, *i. e.* moving and gravitating along with it. In which ſenſe, *maſs* is diſtinguiſhed from bulk, or volume, which is the expanſion of a body in length, breadth, and thickneſs.

The maſs of any body is rightly eſtimated by its weight: and the maſſes of two bodies of the ſame weight are in a reciprocal ratio of their bulks.

MASS, *Miſſa*, in the church of Rome, the office or prayers uſed at the celebration of the euchariſt; or in other words conſecrating the bread and wine into the body and blood of Chriſt, and offering them ſo tranſubſtantiated as an expiatory ſacrifice for the quick and the dead.

As the maſs is in general believed to be a repreſentation of the paſſion of our bleſſed Saviour, ſo every action of the prieſt, and every particular part of the ſervice, is ſuppoſed to allude to the particular circumſtances of his paſſion and death.

Nicod, after Baronius, obſerves that the word comes from the Hebrew *miſſach* (*oblatum*); or from the Latin *miſſa miſſorum*; becauſe in the former times, the catechumens and excommunicated were ſent out of the church, when the deacons ſaid *Ite, miſſa eſt*, after ſermon and reading of the epiſtle and goſpel; they not being allowed to aſſiſt at the conſecration. Menage derives the word from *miſſio*, "diſmiſſing:" Others from *miſſa*, "miſſing, ſending;" becauſe in the maſs, the prayers of men on earth are ſent up to heaven.

The general diviſion of maſſes conſiſts in high and low. The firſt is that ſung by the choriſters, and celebrated with the aſſiſtance of a deacon and ſub-deacon; low maſſes are thoſe in which the prayers are barely rehearſed without ſinging.

There are a great number of different or occaſional maſſes in the Romiſh church, many of which have nothing peculiar but the name: ſuch are the maſſes of the ſaints; that of St Mary of the ſnow, celebrated on the 5th of Auguſt; that of St Margaret, patroneſs of lying-in-women; that of the feaſt of St John the Baptiſt, at which are ſaid three maſſes; that of the innocents, at which the gloria in excelſis and the hallelujah are omitted, and it being a day of mourning, the altar is of a violet colour. As to ordinary maſſes, ſome are ſaid for the dead, and, as is ſuppoſed, contribute to fetch the ſoul out of purgatory: at theſe maſſes the altar is put in mourning, and the only decorations are a croſs in the middle of ſix yellow wax-lights; the dreſs of the celebrant, and the very maſs-book, are black; many parts of the office are omitted, and the people are diſmiſſed without the benediction. If the maſs be ſaid for a perſon diſtinguiſhed by his rank or virtues, it is followed with a funeral oration; they erect a *chapelle ardente*, that is, a repreſentation of the deceaſed with branches and tapers of yellow wax, either in the middle of the church, or near the deceaſed's tomb, where the prieſt pronounces a ſolemn abſolution of the deceaſed. There are likewiſe private maſſes ſaid for ſtolen or ſtrayed goods or cattle, for health, for travellers, &c. which go under the name of *votive maſſes*. There is ſtill a further diſtinction of maſſes denominated from the countries in which they were uſed; thus the Gothic maſs, or *miſſa moſarabum*, is that uſed among the Goths when they were maſters of Spain, and which is ſtill kept up at Toledo and Salamanca; the Ambroſian maſs is that compoſed by St Ambroſe, and uſed only at Milan, of which city he was biſhop; the Gallic maſs, uſed by the ancient Gauls; and the Roman maſs, uſed by almoſt all the churches in the Romiſh communion.

Maſs of the Preſanctified (*miſſa præſanctificatorum*), is a maſs peculiar to the Greek church, in which there is no conſecration of the elements; but after ſinging ſome hymns, they receive the bread and wine which was before conſecrated. This maſs is performed all Lent, except on Saturdays, Sundays, and the annunciation. The prieſt counts upon his fingers the days of the enſuing week on which it is to be celebrated, and cuts off as many pieces of bread at the altar as he is to ſay maſſes; and after having conſecrated them, ſteeps them in wine, and then puts them in a box; out of which, upon every occaſion, he takes ſome of it with a ſpoon, and putting it on a diſh ſets it upon the altar.

MASSA, a town of Italy, in the kingdom of Naples, and in the Terra di Lavoro, with a biſhop's ſee; ſeated on a mountain near the ſea, in E. Long. 10. 0. N. Lat. 43. 5.

MASSA, an ancient, populous, and handſome town of Italy, and capital of a ſmall territory of the ſame name, with the title of a principality, and a ſtrong caſtle. It is famous for quarries of fine marble, and is ſituated in E. Long. 14. 23. N. Lat. 40. 40.

ſets, Maſſacre.

MASSACHUSETS COLONY, the principal ſubdiviſion of New England, having Hampſhire on the north, the Atlantic ocean on the eaſt and ſouth, and Connecticut and New York on the weſt. It is about 100 miles long, and 40 broad. See *New England*.

MASSACRE, a term uſed to ſignify the ſudden and promiſcuous butchery of a multitude. The moſt atrocious example of this kind upon record is that called the *Pariſian Maſſacre*, or *Maſſacre of St Bartholomew's Day*. The Pariſian maſſacre was carried on with ſuch deteſtable perfidy, and executed with ſuch a bloody cruelty, as would ſurpaſs all belief, were it not atteſted by the moſt undeniable evidence. In the year 1572, in the reign of Charles IX. many of the principal Proteſtants were invited to Paris, under a ſolemn oath of ſafety, upon occaſion of the marriage of the king of Navarre with the French king's ſiſter; viz. the king of Navarre's mother, Coligni admiral of France, with other nobles. The queen-dowager of Navarre, a zealous Proteſtant, was poiſoned by a pair of gloves before the marriage was ſolemnized; and on the 24th of Auguſt 1572, being Bartholomew's day, about daybreak, upon the toll of the bell of the church of St Germain, the butchery began. The admiral was baſely murdered in his own houſe; and then thrown out of the window, to gratify the malice of the duke of Guiſe; his head was afterwards cut off, and ſent to the king and queen-mother; and his body, after a thouſand indignities offered to it, hung up by the feet on a gibbet. After this, the murderers ravaged the whole city of Paris, and butchered in three days above ten thouſand lords, gentlemen, preſidents, and people of all ranks. An horrible ſcene of things, ſays Thuanus, when the very ſtreets and paſſages reſounded with the noiſe of thoſe that met together for murder and plunder; the groans of thoſe who were dying, and the ſhrieks of ſuch as were juſt going to be butchered, were everywhere heard; the bodies of the ſlain thrown out of the windows; the courts and chambers of the houſes filled with them; the dead bodies of others dragged through the ſtreets, their blood running down the channels in ſuch plenty, that torrents ſeemed to empty themſelves in the neighbouring river: and, in a word, an innumerable multitude of men, women with child, maidens, and children, were all involved in one common deſtruction; and the gates and entrances of the king's palace all beſmeared with their blood.

From the city of Paris the maſſacre ſpread almoſt throughout the whole kingdom. In the city of Meaux they threw above two hundred into jail; and after they had raviſhed and killed a great number of women, and plundered the houſes of the Proteſtants, they executed their fury on thoſe they had impriſoned, and calling them out one by one, they were killed, as Thuanus expreſſes, like ſheep in a market; the bodies of ſome were flung into ditches, and of others into the river Maine. In Orleans they murdered above five hundred men, women, and children, and enriched themſelves with their ſpoil. The ſame cruelties were practiſed at Angers, Troyes, Bourges, La Charité, and eſpecially at Lyons, where they inhumanly deſtroyed above eight hundred Proteſtants; children hanging on their parents necks; parents embracing their children; putting ropes about the necks of ſome, dragging them through the ſtreets, and throwing them, mangled, torn, and half dead, into the river.

It would be endleſs to mention the butcheries committed at Valence, Romaine, Rouen, &c. We ſhall, therefore, only add, that, according to Thuanus, above thirty thouſand Proteſtants were deſtroyed in this maſſacre, or as others with greater probability affirm, above one hundred thouſand.

Thuanus himſelf calls this a moſt deteſtable villany; and, in abhorrence of St Bartholomew's day, uſed to repeat theſe words of P. Statius, Silv. v. iii. ver. 88. &c.

Excidat illa dies ævo, ne poſtera credant
Sæcula. Nos certe taceamus, et obruta multa
Nocte tegi propriæ patiamus crimina gentis.

In the words of Job, chap. iii. ver. 3. &c. "Let that day periſh; and let it not be joined unto the days of the year. Let darkneſs and the ſhadow of death ſtain it," &c. And yet, as though this had been the moſt heroic tranſaction, and could have procured immortal glory to the authors of it, medals were ſtruck at Paris in honour of it.

But how were the news of this butchery received at Rome, that faithful city, that holy mother of churches! How did the vicar of Chriſt, the ſucceſſor of Peter, and the father of the Chriſtian world, reliſh it? Let Thuanus tell the horrid truth. When the news, ſays he, came to Rome, it was wonderful to ſee how they exulted for joy. On the 6th of September, when the letters of the pope's legate were read in the aſſembly of the cardinals, by which he aſſured the pope that all was tranſacted by the expreſs will and command of the king, it was immediately decreed that the pope ſhould march with his cardinals to the church of St Mark, and in the moſt ſolemn manner give thanks to God for ſo great a bleſſing conferred on the ſee of Rome and the Chriſtian world; and that on the Monday after, ſolemn maſs ſhould be celebrated in the church of Minerva; at which the pope, Greg. XIII. and cardinals were preſent; and that a jubilee ſhould be publiſhed throughout the whole Chriſtian world, and the cauſe of it declared to be, to return thanks to God for the extirpation of the enemies of the truth and church in France. In the evening the cannon of St Angelo were fired, to teſtify the public joy; the whole city illuminated with bonfires; and no one ſign of rejoicing omitted that was uſually made for the greateſt victories obtained in favour of the Roman church.

MASSAGETÆ, an ancient people about whoſe ſeat there is as much doubt as about that of the Amazons; Tibullus and Ammian place them near Albania, beyond the Araxes, which ſometimes denotes the Oxus; it is probable they dwelt to the eaſt of Sogdiana, (Dionyſius Periegetes, Herodotus, Arrian.)

MASSALIANS, a ſet of enthuſiaſts who ſprang up about the year 361, in the reign of the emperor Conſtantius, who maintained that men have two ſouls, a celeſtial and a diabolical, and that the latter is driven out by prayer.

MASSANIELLO. See *Hiſtory of* NAPLES.

MASSETER, in *Anatomy*. See there (*Table of the Muſcles*.)

MASSICOT. See MASTICOT.

MASSIEU, WILLIAM, a learned French writer, member of the Academy of Belles Lettres, and of the French Academy, was born at Caen in Normandy in 1665, and completed his ſtudies at Paris, when he entered amongſt the Jeſuits; but afterwards left them, that he might follow his inclination to polite literature with the greater freedom. In 1710 he was made Greek profeſſor in the royal college; and enjoyed that poſt till his death, which happened at Paris in 1722. He wrote, 1. Several curious diſſertations in the Memoirs of the Academy of Inſcriptions. 2. A hiſtory of the French poetry, in 12mo, &c.

MASSILIA, in *Ancient Geography*, a town of Gallia Narbonenſis, a colony of Phoceans, from Phocæa, a city of Ionia, and in confederacy with the Romans; univerſally celebrated, not only for its port, commerce, and ſtrength, but eſpecially for its politeneſs of manners and for its learning. According to Strabo, it was the ſchool for the barbarians, who were excited by its means to a fondneſs for Greek literature, ſo that even their public and private tranſactions were all executed in that language. Strabo adds, "At this day the nobleſt Romans repair thither for ſtudy rather than to Athens." Now *Marſeilles*, a city and port town of Provence.

MASSILLON, JEAN BAPTISTE, ſon of a notary at Hieres in Provence, was born in 1663, and entered into the congregation of the oratory in 1681. He gained the affections of every perſon in the towns to which he was ſent, by the charms of his genius, the livelineſs of his character, and by a fund of the moſt delicate and unaffected politeneſs. His firſt attempts in the art of eloquence were made at Vienne, while he was profeſſor of theology. His funeral oration on Henry de Villars, archbiſhop of that city, received univerſal approbation. This ſucceſs induced Father de la Tour, who was at that time general of the congregation, to call him to Paris. After he had been there for ſome time, he was aſked what he thought of the preachers who made a figure on that great theatre?—"I find them poſſeſſed of great genius and abilities (anſwered he); but if I preach, I will not preach like them." He in fact kept his word, and ſtruck out a new path in this great field of eloquence. P. Bourdaloue was excepted from the number of thoſe whom he propoſed not to imitate. If he did not take him for a model in every thing, the reaſon was, that his genius led him to a different ſpecies of eloquence.—His manner of compoſing, therefore, was peculiar to himſelf, and, in the opinion of men of taſte and judgement, was ſuperior to that of Bourdaloue. The affecting and natural ſimplicity of the father of the oratory, (ſaid a great man), appears fitter to bring home the truths of Chriſtianity to the heart than all the dialectics of the Jeſuit. We muſt ſeek for the logic of the goſpel in our own breaſts; and the moſt powerful reaſonings on the indiſpenſable duty of relieving the diſtreſſed, will make no impreſſion on that man who has beheld without concern the ſufferings of his brother. If logic is neceſſary, it is only in matters of opinion; and theſe are fitter for the preſs than for the pulpit, which

Maſſillon. which ought not to be the theatre of learned diſcuſſions. The truth of theſe reflections was clearly perceived when he appeared at court. Upon preaching his firſt Advent ſermon at Verſailles, he received this eulogium from the mouth of Louis XIV. “ Father, when I hear others preach, I am very well pleaſed with them; but whenever I hear you, I am diſſatiſfied with myſelf. The firſt time he preached his famous ſermon *on the ſmall number of the elect*, the whole audience were, at a certain place of it, ſeized with a ſudden and violent emotion, and almoſt every perſon half roſe from his ſeat by a kind of involuntary movement. The murmur of acclamation and ſurpriſe was ſo great, that it threw the orator into confuſion; but this only heightened the impreſſion of that pathetic diſcourſe. What was moſt ſurpriſing in Maſſillon, were his deſcriptions of the world, which were ſo ſublime, ſo delicate, and ſo ſtriking in the reſemblance. When he was aſked, whence a man, like him, whoſe life was dedicated to retirement, could borrow them; he anſwered, “ From the human heart; however little we examine it, we will find in it the ſeeds of every paſſion. When I compoſe a ſermon (added he), I imagine myſelf conſulted upon ſome doubtful piece of buſineſs. I give my whole application to determine the perſon who has recourſe to me, to act the good and proper part. I exhort him, I urge him, and I leave him not till he has yielded to my perſuaſions.” His declamation did not fail to be accompanied with ſucceſs. “ We think we ſee him in our pulpits (ſay thoſe who had the pleaſure of hearing him), with the ſimple air, the modeſt carriage, the downcaſt and humble looks, the eaſy geſture, the affecting tone, and the countenance of a man deeply penetrated with his ſubject, conveying the cleareſt information to the underſtanding, and raiſing the moſt tender emotions in the heart.” Baron, the famous comedian, having met him one day in a houſe which was open for the reception of men of letters, paid him this compliment: “ Continue to deliver as you do. Your manner is peculiar to yourſelf; leave the obſervance of rules to others.” When this famous actor came from hearing one of his ſermons, truth drew from him the following confeſſion, which is ſo humiliating to his profeſſion: “ Friend (ſaid he to one of his companions who accompanied him), here is an *orator*; we are only *actors*.”

In 1704 Maſſillon made his ſecond appearance at court, and diſplayed ſtill more eloquence than before. Louis XIV. after expreſſing his ſatisfaction to him, added, in the moſt gracious tone of voice, *Et je veaux, mon pere, vous entendre tous les deux ans.* Theſe flattering encomiums did not leſſen his modeſty. When one of his fellows was congratulating him upon his preaching admirably, according to cuſtom; Oh! give over, Father (replied he), the devil has told me ſo already, much more eloquently than you.” The duties of his office did not prevent him from enjoying ſociety; and in the country he forgot that he was a preacher, but always without treſpaſſing againſt decency. One day when he was at the houſe of M. de Crozat, the latter ſaid to him, “ Father, your doctrine terrifies me, but I am encouraged by your life.” He was choſen on account of his philoſophical and conciliatory diſpoſition of mind, to reconcile the cardinal de Noailles with the Jeſuits. All he gained by his attempt was Maſſillon. the diſpleaſure of both parties; and he found that it was eaſier to convert ſinners than to reconcile theologians. In 1717, the regent, perfectly acquainted with his merit, appointed him to the biſhopric of Clermont. The next year, being deſtined to preach before Louis XV. who was only nine years of age, he compoſed in ſix weeks thoſe diſcourſes which are ſo well known by the name of *Petit Careme*. Theſe are the chef d'œuvre of this orator, and indeed of the oratorical art. They ought continually to be read by preachers as models for the formation of their taſte, and by princes as leſſons of humanity.

Maſſillon was admitted into the French academy a year afterwards, in 1719. The abbacy of Savigny becoming vacant, the cardinal du Bois, to whom he had been weak enough to give an atteſtation for being a prieſt, procured it for him. The funeral oration of the ducheſs of Orleans, in 1723, was the laſt diſcourſe he pronounced in Paris. He never afterwards left his dioceſe, where his gentleneſs, politeneſs, and kindneſs, had gained him the affection of all who knew him. He reduced the exorbitant rights of the epiſcopal roll to moderate ſums. In two years, he cauſed 20,000 livres to be privately conveyed to the Hotel Dieu of Clermont. His peaceable diſpoſition was never more diſplayed than while he was a biſhop. He took great pleaſure in collecting the fathers of the oratory and the Jeſuits at his country houſe, and in making them join in ſome diverſion. He died on the 28th of September 1742, at the age of 79. His name has become that of eloquence itſelf. Nobody ever knew better how to touch the paſſions. Preferring ſentiment to every thing elſe, he communicated to the ſoul that lively and ſalutary emotion which excites in us the love of virtue. What pathetic eloquence did his diſcourſes diſplay! what knowledge of the human heart! what conſtant diſcloſing of a mind deeply affected with his ſubject! what ſtrain of truth, philoſophy and humanity! what imagination, at once the moſt lively, and guided by the ſoundeſt judgement! Juſt and delicate thoughts; ſplendid and lofty ideas, elegant, well choſen, ſublime, and harmonious expreſſions; brilliant and natural images; true and lively colouring; a clear, neat, ſwelling and copious ſtyle, equally ſuited to the capacity of the multitude, and fitted to pleaſe the man of genius, the philoſopher, and the courtier, form the character of Maſſillon's eloquence, eſpecially in his *Petit Careme*. He could at once think, deſcribe, and feel. It has been juſtly obſerved concerning him, that he was to Bourdaloue what Racine was to Corneille. To give the finiſhing ſtroke to his eulogium, Of all the French orators, he is the moſt eſteemed by foreigners.

An excellent edition of Maſſillon's works was publiſhed by his nephew at Paris in 1745 and 1746, in 14 vols large 12mo, and 12 vols of a ſmall 12mo.—Among them we find, 1. Complete ſets of Sermons for Advent and Lent. It is particularly in his moral diſcourſes, ſuch as are almoſt all thoſe of his ſermons for Advent and Lent, that Maſſillon's genius appears. He excels, ſays M. d'Alembert, in that ſpecies of eloquence, which alone may be preferred to all others, which goes directly to the heart, and which agitates without wounding the ſoul. He ſearches the inmoſt

receſſes

Maſſillon, Maſſinger.

receſſes of the heart, and lays open the ſecret workings of the paſſions, with ſo delicate and tender a hand, that we are hurried along rather than overcome. His diction, which is always eaſy, elegant, and pure, everywhere partakes of that noble ſimplicity, without which there can be neither good taſte nor true eloquence; and this ſimplicity is, in Maſſillon, joined to the moſt attractive and the ſweeteſt harmony, from which it likewiſe borrows new graces. In ſhort, to complete the charm produced by this enchanting ſtyle, we perceive that theſe beauties are perfectly natural; that they flow eaſily from this ſource, and that they have occaſioned no labour to the compoſer. There even occur ſometimes in the expreſſions, in the turns, or in the affecting melody of his ſtyle, inſtances of negligence which may be called happy, becauſe they completely remove every appearance of labour. By thus abandoning himſelf to the natural current of thought and expreſſion, Maſſillon gained as many friends as hearers. He knew, that the more anxious an orator appears to raiſe admiration, he will find thoſe who hear him the leſs diſpoſed to beſtow it. 2. Several Funeral Orations, Diſcourſes, and Panegyrics, which had never been publiſhed. 3. Ten diſcourſes, known by the name of *Petit Careme*. 4. The *Conferences Eccleſiaſtiques*, which he delivered in the ſeminary of St Magloire upon his arrival at Paris; thoſe which he delivered to the curates of his dioceſe; and the diſcourſes which he pronounced at the head of the ſynods which he aſſembled every year. 5. Paraphraſes on ſeveral of the Pſalms. The illuſtrious author of theſe excellent tracts wiſhed that they had introduced into France a practice which prevails in England, of reading ſermons inſtead of preaching them from memory; a cuſtom which is very convenient, but by which all the warmth and fervour of eloquence are loſt. He, as well as two others of his brethren, had ſtopt ſhort in the pulpit exactly on the ſame day.—They were all to preach at different hours on Good-Friday, and they went to hear one another in ſucceſſion. The memory of the firſt failed; which ſo terrified the other two, that they experienced the ſame fate. When our illuſtrious orator was aſked, what was his beſt ſermon? he anſwered, "That which I am moſt maſter of." The ſame reply is aſcribed to Bourdaloue. The celebrated P. la Rue was of the opinion of Maſſillon, that getting by heart was a ſlavery which deprived the pulpit of a great many orators, and which was attended with many inconveniences to thoſe who dedicated themſelves to it. The abbé de la Porte has collected into one vol. 12mo the moſt ſtriking ideas, and the moſt ſublime ſtrokes, which occur in the works of the celebrated biſhop of Clermont. This collection, which is made with great judgement, appeared at Paris in 1748, 12mo, and forms the 15th volume of the large edition in 12mo, and the 13th of the ſmall in 12mo. It is entitled, *Penſées ſur differens ſujets de morale et de pieté, tirées*, &c.

MASSINGER, Philip, an Engliſh dramatic poet, was born at Saliſbury about the year 1581, and was educated at Oxford. He left the univerſity without taking any degree; and went to London to improve his poetical genius by polite converſation. There he wrote many tragedies and comedies, which were received with vaſt applauſe; and were greatly admired for the economy of the plots and the purity of the ſtyle. He was at the ſame time a perſon of the moſt conſummate modeſty; which rendered him extremely beloved by the poets of his time, particularly by Fletcher, Middleton, Rowley, Field, and Decker, who thought it an honour to write in conjunction with him. He was as remarkable for his abilities as his modeſty. He died ſuddenly at his houſe on the Bank-ſide in Southwark, near the playhouſe; and was interred in St Saviour's churchyard, in the ſame grave with Mr Fletcher the poet.

Maſſive, Maſſon.

MASSIVE, among builders, an epithet given to whatever is too heavy and ſolid: thus a maſſive column is one too ſhort and thick for the order whoſe capital it bears; and a maſſive wall is one whoſe openings or lights are too ſmall in proportion.

MASSON, Papirius, a French writer, was the ſon of a rich merchant, and born in the territory of Forez, May 1544. After ſtudying the belles lettres and philoſophy, and travelling to different places, he came to Paris, where he was made librarian to the chancellor of the duke of Anjou, in which place he continued ten years. In 1576, he was made an advocate of parliament; yet never pleaded but one cauſe, which, however, he gained with univerſal applauſe.—When the troubles of France were at an end, he married the ſiſter of a counſellor in parliament, with whom he lived thirty-four years, but had no iſſue by her.—The infirmities of age attacked him ſome time before his death, which happened Jan. 9. 1611. He wrote four books of French annals in Latin, firſt printed at Paris 1577, and afterwards in 1598, 4to. The ſecond edition, more enlarged than the firſt, deduces things from Pharamond to Henry II. Maſſon conſidered this as his principal performance; yet he is now chiefly known by his *Elogia virorum clariſſimorum*, although he publiſhed ſeveral other works.

Masson, *John*, a reformed miniſter in Holland ſome years ago. He was originally of France, but fled into England, to enjoy that liberty in religion which his country refuſed him. He wrote, 1. *Hiſtoire critique de la republique des lettres*, from 1712 to 1717, in 15 vols 12mo. 2. *Vitæ Horatii, Ovidii, et Perſii junioris*," 3 vols ſmall 8vo, and printed abroad, though dedicated to Engliſhmen of rank: the firſt at Leyden, 1708, to Lord Harvey; the ſecond at Amſterdam, 1708, to Sir Juſtinian Iſham; the third at Amſterdam, 1709, to the biſhop of Worceſter. Theſe lives are drawn up in a chronological order, very learnedly and very critically; and ſerve to illuſtrate the hiſtory, not only of thoſe particular perſons, but of the times alſo in which they lived. 3. *Hiſtoire de Pierre Bayle et des ſes ouvrages*; Amſterdam, 1716, in 12mo. This at leaſt is ſuppoſed to be his, though at firſt it was given to M. la Monnoye.

Masson, *Antony*, an eminent French engraver, who flouriſhed towards the concluſion of the laſt century, and reſided chiefly at Paris. It appears that he ſometimes amuſed himſelf with painting portraits from the life, ſome of which he alſo engraved. We have no account of the life of this extraordinary artiſt; nor are we even informed from what maſter he learned the principles of engraving. He worked entirely with the graver, and handled that inſtrument with aſtoniſhing facility. He ſeems to have had no kind of rule ſſuah.

to direct him with reſpect to the turning of the ſtrokes; but twiſted and twirled them about, without the leaſt regard to the different forms he intended to expreſs, making them entirely ſubſervient to his own caprice. Yet the effect he has produced in this ſingular manner (Mr Strutt obſerves), is not only far ſuperior to what one could have ſuppoſed, but is often very pictureſque and beautiful. It was not in hiſtorical engraving that his greateſt ſtrength conſiſted. He could not draw the naked parts of the human figure ſo correctly as was neceſſary; but where the ſubject required the figures to be clothed, he ſucceeded in a wonderful manner. Among the moſt eſteemed works by this admirable artiſt, may be reckoned the following: The aſſumption of the Virgin, a large upright plate from Rubens; a holy family, a middling ſized plate, lengthwiſe, from N. Mignard; Chriſt with the pilgrims at Emaus, a large plate, lengthwiſe, from Titian, the original picture of which is in the cabinet of the king of France. This admirable print is commonly known by the name of *the table-cloth*: for the cloth, with which the table is covered, is executed in a very ſingular ſtyle. Alſo the following portraits, among others: The Comte de Harcourt, a large upright plate, reckoned a maſterpiece in this claſs of ſubjects; Guillaume de Briſacier, ſecretary to the queen of France; a middling-ſized upright plate: uſually known in England by the name of *the Gray-headed Man*, becauſe the hair in this print is ſo finely executed.

MASSUAH, a ſmall iſland in the Red ſea, near the coaſt of Abyſſinia, about three quarters of a mile long, and half as broad, one-third of which is occupied by houſes, another by ciſterns for receiving rain-water, and one reſerved for a burial place. It has an excellent harbour, with water ſufficiently deep for ſhips of any ſize to the very edge of the iſland; and ſo well ſecured, that they may ride in ſafety, let the wind blow from what quarter or with what degree of ſtrength it will. By the ancients it was called *Sebaſticum Os*, and was formerly a place of great conſequence on account of its harbour, from whence a very extenſive commerce was carried on, and poſſeſſed a ſhare of the Indian trade in common with other ports of the Red ſea near the Indian ocean.—A very conſiderable quantity of valuable goods was alſo brought thither from the tract of mountainous country behind it, which in all ages has been accounted very unhoſpitable, and almoſt inacceſſible to ſtrangers. The principal articles of exportation were gold, ivory, elephants and buffaloes hides; but above all, ſlaves, who, on account of their perſonal qualifications, were more eſteemed than thoſe from any other quarter. Pearls of a conſiderable ſize, and of a fine water, are likewiſe found along the coaſt; from the abundance of all which valuable commodities, the great defect, a want of water, was forgot, and the inhabitants cheerfully ſubmitted to ſuch a great inconvenience. The iſland of Maſſuah fell under the power of the Turks in the time of the emperor Selim, ſoon after the conqueſt of Arabia Felix by Sinan Baſha, and was for ſome time governed by an officer from Conſtantinople. From thence the conqueſt of Abyſſinia was for ſome time attempted, but always without ſucceſs. Hence it began to loſe its value as a garriſon for troops, as it had done in the commercial way after the diſcovery of the paſſage to India by the Cape of Good Hope.—Being thus deprived of its importance in every reſpect, the Turks no longer thought it worth while to ſend a baſhaw thither as formerly, but conferred the government upon the chief of a tribe of Mahometans named *Belowee*, who inhabit the coaſt of the Red ſea under the mountains of Habab, in the latitude of about 14° north. On this officer they conferred the title of *Naybe*; and on the removal of the baſhaws, he remained in fact maſter of the place, though, to ſave appearances, he pretended to hold it from the Ottoman Porte, by a firman from the Grand Signior for that purpoſe, and the payment of an annual tribute.

The Turks had originally put into the town of Maſſuah a garriſon of Janizaries; who, being left there on the withdrawing of the baſhaw, and intermarrying with the natives, ſoon became entirely ſubjected to the naybe's influence. The latter, finding himſelf at a great diſtance from his protectors the Turks, whoſe garriſons were everywhere falling into decay, and that in conſequence of this he was entirely in the power of the emperor of Abyſſinia, began to think of taking ſome method of ſecuring himſelf on that ſide. Accordingly it was agreed that one half of the cuſtoms ſhould be paid to the Abyſſinian monarch; who in return was to allow him to enjoy his government unmoleſted. Having thus ſecured the friendſhip of the emperor of Abyſſinia, the naybe began gradually to withdraw the tribute he had been accuſtomed to pay to the baſhaw of Jidda, to whoſe government Maſſuah had been aſſigned; and at laſt to pay as little regard to the government of Abyſſinia: and in this ſtate of independence he was when Mr Bruce arrived there in 1769 on his way to Abyſſinia. This gentleman found both the prince and his people extremely unhoſpitable and treacherous; ſo that he underwent a variety of dangers during his reſidence there, nor was it without great difficulty that he could get away from thence at laſt.

The iſland of Maſſuah, as we have ſaid, is entirely deſtitute of water; nor can it be ſupplied with proviſions of any kind but from the mountainous country of Abyſſinia on the continent. Arkeeko, a large town in the bottom of the boy, has water, but is in the ſame predicament with regard to proviſions; for the adjacent tract of flat land, named *Samhar*, is a perfect deſert, inhabited only from the month of November to April by ſome wandering tribes, who carry all their cattle to the Abyſſinian ſide of the mountains when the rains fall there. Being thus in the territories of the Abyſſinians, it is in the power of the emperor of that country, or of his officer the baharnagaſh, to ſtarve Maſſuah and Arkeeko, by prohibiting the paſſage of any proviſions from the Abyſſinian ſide of the mountains.

The houſes of Maſſuah are generally conſtructed of long poles and bent graſs, as is uſual with other towns of Arabia: only about 20 are of ſtone, and ſix or eight of theſe two ſtories high. The ſtones with which they are built have been drawn out of the ſea; and in them the bed of that curious muſcle found embodied in the ſolid rock at Mahon is frequently to be ſeen. Theſe are called *dattoli da mare*, or ſea dates: but our author never ſaw any of the fiſh themſelves,

Maſſuah
||
Maſt.

though he has no doubt that they may be met with in the rocky iſlands of Maſſuah, if they would take the trouble of breaking the rocks for them. All the neceſſaries of life are very dear in this place; and their quality is alſo very indifferent, owing to the diſtance from whence they muſt be brought, and the danger of carrying them through the deſert of Samhar, as well as to the extortions of the naybe himſelf, who, under the name of *cuſtoms*, takes whatever part of the goods he thinks proper; ſo the profit left to the merchant is ſometimes little or nothing. All the money here is valued by the Venetian ſequin; and it is owing to the commercial intercourſe with the Arabian coaſt, that any money at all is to be met with on this iſland or the eaſtern coaſt of Africa. Glaſs beads of all kinds and colours, whether whole or broken, paſs for ſmall money.

Though Maſſuah has now loſt very much of its commercial importance, a conſiderable trade is ſtill carried on from the place. From the Arabian ſide are imported blue cotton and other cloths; ſome of them from India being very fine. Other articles are Venetian beads, cryſtal, looking and drinking glaſſes, with cohol or crude antimony. Theſe three laſt articles come in great quantity from Cairo, firſt in the coffee ſhips to Jidda, and then in ſmall barks to the port of Maſſuah. Old copper is alſo a valuable article of commerce. The Galla and all the various tribes to the weſtward of Gondar wear bracelets of this metal, which in ſome parts of that barbarous country is ſaid to ſell for its weight of gold. Here is alſo a ſhell, an univalve of the ſpecies of volutes, which ſells at a high price, and paſſes for money among the various tribes of Galla. The Banians were once the principal merchants of Maſſuah; but their number is now reduced to ſix, who are ſilverſmiths, and ſubſiſt by making ornaments for the women on the continent. They likewiſe eſſay gold, but make a poor livelihood.

MASSUET, Rene, or Renatus, a very learned Benedictine of the congregation of St Maur, was born at S. Owen de Macelles, in 1665. He is chiefly known for the new edition of St Irenæus, which he publiſhed in 1710. He conſulted ſeveral manuſcripts, which had never been examined for that purpoſe, and made new notes and learned prefaces. He died in 1716, after having written and publiſhed ſeveral other works.

MAST, a long round piece of timber, elevated perpendicularly upon the keel of a ſhip, to which are attached the yards, the ſails, and the rigging. A maſt, with regard to its length, is either formed of one ſingle piece, which is called a *pole-maſt*, or compoſed of ſeveral pieces joined together, each of which retains the name of maſt ſeparately. The loweſt of theſe is accordingly named the *lower-maſt*, *a* fig. 1.; the next in height is the top-maſt, *b*, which is erected at the head of the former; and the higheſt is the top-gallant-maſt, *c*, which is prolonged from the upper end of the top-maſt. Thus the two laſt are no other than a continuation of the firſt upwards.

Plate
CCCXV.

The lower-maſt is fixed in the ſhip by an apparatus deſcribed in the articles Hulk and Sheers: the foot, or heel of it, reſts in a block of timber called the *ſtep*, which is fixed upon the *kelſon*: and the top-maſt is attached to the head of the lower-maſt by the cap and the treſtle-trees. The latter of theſe are two ſtrong bars of timber, ſupported by two prominences, which are as ſhoulders on the oppoſite ſides of the maſt, a little under its upper end: athwart theſe bars are fixed the *croſs-trees*, upon which the frame of the top is ſupported. Between the lower maſt head and the foremoſt of the croſs-trees, a ſquare ſpace remains vacant, the ſides of which are bounded by the two treſtle-trees. Perpendicularly above this is the foremoſt hole in the cap, whoſe after hole is ſolidly fixed on the head of the lower-maſt. The top-maſt is erected by a tackle, whoſe effort is communicated from the head of the lower maſt to the foot of the top-maſt; and the upper end of the latter is accordingly guided into and conveyed up through the holes between the treſtle-trees and the cap, as above mentioned. The machinery by which it is elevated, or, according to the ſea phraſe, *ſwayed up*, is fixed in the following manner: the top rope *d*, fig. 3. paſſing through a block *e*, which is hooked on one ſide of the cap, and afterwards through a hole, furniſhed with a ſheave or pulley *f*, on the lower end of the top-maſt, is again brought upwards on the other ſide of the maſt, where it is at length faſtened to an eye-bolt in the cap *g*, which is always on the ſide oppoſite to the top-block *e*. To the lower end of the top-rope is fixed the top-tackle *h*, the effort of which being tranſmitted to the top-rope *d*, and thence to the heel of the top-maſt *f*, neceſſarily lifts the latter upwards, parallel to the lower-maſt. When the top-maſt is raiſed to its proper height, fig. 4. the lower end of it becomes firmly wedged in the ſquare hole above deſcribed, between the treſtle-trees. A bar of wood or iron called the *fid*, is then thruſt through a hole *i* in the heel of it, acroſs the treſtle-trees, by which the whole weight of the top-maſt is ſupported.

Maſt.

In the ſame manner as the top-maſt is retained at the head of the lower-maſt, the top-gallant-maſt is erected, and fixed at the head of the top-maſt.

Beſides the parts already mentioned in the conſtruction of maſts, with reſpect to their length, the lower maſts of the largeſt ſhips are compoſed of ſeveral pieces united into one body. As theſe are generally the moſt ſubſtantial parts of various trees, a maſt, formed by this aſſemblage, is juſtly eſteemed much ſtronger than one conſiſting of any ſingle trunk, whoſe internal ſolidity may be very uncertain. The ſeveral pieces are formed and joined together, as repreſented in the ſection of a lower-maſt of this ſort, fig. 5. where *a* is the ſhaft, or principal piece into which the reſt are fixed, with their ſides or faces cloſe to each other. The whole is ſecured by ſeveral ſtrong hoops of iron, driven on the outſide of the maſt, where they remain at proper diſtances.

The principal articles to be conſidered in equipping a ſhip with maſts are, 1ſt, the number; 2d, their ſituation in the veſſel; and, 3d, their height above the water.

The maſts being uſed to extend the ſails by means of their yards, it is evident, that if their number were multiplied beyond what is neceſſary the yards muſt be extremely ſhort, that they may not entangle each other in working the ſhip, and by conſequence their ſails will be very narrow, and receive a ſmall portion of wind. If, on the contrary, there is not a ſufficient number of maſts in the veſſel, the yards will be too large

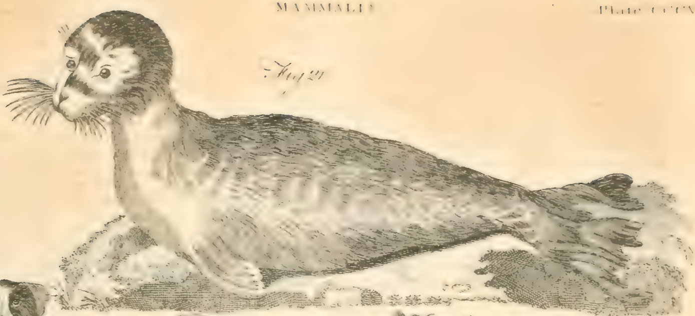

Fig. 21.

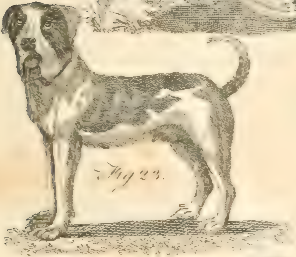

Fig. 23.

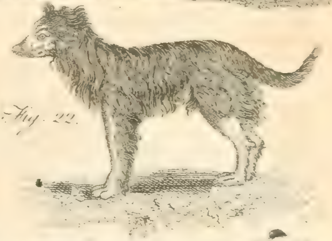

Fig. 22.

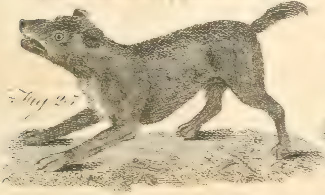

Fig. 25.

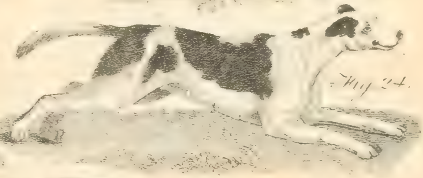

Fig. 24.

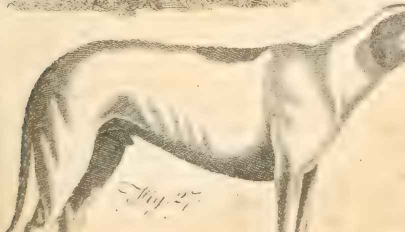

Fig. 27.

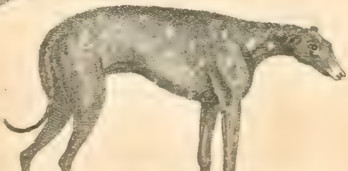

Fig. 26.

large and heavy, ſo as not to be managed without difficulty. There is a mean between theſe extremes, which experience and the general practice of the ſea have determined; by which it appears, that in large ſhips every advantage of ſailing is retained by three maſts and a bowſprit.

The moſt advantageous poſition of the maſts is undoubtedly that from whence there reſults an equilibrium between the reſiſtance of the water on the body of the ſhip on the one part, and of the direction of their effort on the other. By every other poſition this equilibrium is deſtroyed, and the greateſt effort of the maſts will operate to turn the ſhip horizontally about its direction; a circumſtance which retards her velocity. It is counterbalanced indeed by the helm; but the ſame inconvenience ſtill continues; for the force of the wind, having the reſiſtance of the helm to overcome, is not entirely employed to puſh the veſſel forward. The axis of the reſiſtance of the water ſhould then be previouſly determined, to diſcover the place of the *main-maſt*, in order to ſuſpend the efforts of the water equally, and place the other maſts ſo as that their particular direction will coincide with that of the main-maſt. The whole of this would be capable of a ſolution, if the figure of the veſſel were regular, becauſe the point, about which the reſiſtance of the water would be in equilibrio, might be diſcovered by calculation.

But when the real figure of the ſhip is conſidered, theſe flattering ideas will inſtantly vaniſh. This obſervation induced M. Saverien to employ a mechanical method to diſcover the axis of reſiſtance of the water, which he apprehended, might be uſed with ſucceſs in the manner following:

When the veſſel is launched, before the places of the maſts are determined, extend a rope AB, fig. 6. from the head to the ſtern. To the extremities A and B attach two other ropes, AD, BC, and apply to the other ends of theſe ropes two mechanical powers, to draw the ſhip according to the direction BC, parallel to itſelf. The whole being thus diſpoſed, let a moveable tube Z, fixed upon the rope AB, have another rope ZR attached to it, whoſe other end communicates with a mechanical power R, equal to the two powers D and C. This laſt being applied to the ſame veſſel, in ſuch manner as to take off the effects of the two others by ſliding upon the rope AB, ſo as to diſcover ſome point Z, by the parallelism of the ropes, AD, BC feebly extended with the rope ZR; the line ZR will be the axis of the equilibrium of the water's reſiſtance, and by conſequence the main-maſt ſhould be planted in the point Z.

The figures E, E, E, are three windlaſſes on the ſhore, by which this experiment is applied.

With regard to the ſituation of the other maſts, it is neceſſary, in the ſame manner, to diſcover two points; ſo that the direction of the two mechanical powers operating, will be parallel to the axis of reſiſtance RZ already found.

The exact height of the maſts, in proportion to the form and ſize of the ſhip, remains yet a problem to be determined. The more the maſts are elevated above the centre of gravity, the greater will be the ſurface of ſail which they are enabled to preſent to the wind; ſo far an additional height ſeems to have been advantageous. But this advantage is diminiſhed by the circular movement of the maſt, which operates to make the veſſel ſtoop to its effort; and this inclination is increaſed in proportion to the additional height of the maſt, an inconvenience which it is neceſſary to guard againſt. Thus what is gained upon one hand is loſt upon the other. To reconcile theſe differences, it is certain, that the height of the maſt ought to be determined by the inclination of the veſſel, and that the point of her greateſt inclination ſhould be the term of this height above the centre of gravity. See the article Trim.

With regard to the general practice of determining the height of the maſts, according to the different rates of the ſhips in the royal navy, the reader is referred to the article Sail.

In order to ſecure the maſts, and counterbalance the ſtrain they receive from the effort of the ſails impreſſed by the wind, and the agitation of the ſhip at ſea, they are ſuſtained by ſeveral ſtrong ropes, extended from their upper ends to the outſide of the veſſel, called *ſhrouds*, as repreſented in fig. 4. They are further ſupported by other ropes, ſtretched from their heads towards the fore part of the veſſel.

The maſt, which is placed at the middle of the ſhip's length, is called the *main-maſt;* that which is placed in the fore part, the *fore-maſt;* and that which is towards the ſtern, is termed the *mizen-maſt*.

N. B. *Mizen* is applied to this maſt by all the nations of Europe, except the French, who alone call the fore-maſt *miſaine*.

MASTER, a title given to ſeveral officers and perſons of authority and command; particularly to the chiefs of the orders of knighthood, &c.—Thus we ſay the grand maſter of Malta; of St Lazarus; of the Golden Fleece; of the Free Maſons, &c.

Master (*Magiſter*), was a title frequent among the Romans: they had their maſter of the people, *magiſter populi*, who was the dictator. Maſter of the cavalry, *magiſter equitum*, who held the ſecond poſt in an army after the dictator. Under the later emperors there were alſo maſters of the infantry, *magiſtri peditum*. A maſter of the cenſus, *magiſter cenſus*, who had nothing of the charge of a cenſor, or ſubcenſor, as the name ſeems to intimate; but was the ſame with the *præpoſitus frumentariorum*.

Master of the Militia (magiſter militiæ), was an officer in the lower empire, created, as it is ſaid, by Diocleſian, who had the inſpection and government of all the forces, with power to puniſh, &c. ſomewhat like a conſtable of France. At firſt there were two of theſe officers inſtituted, the one for the infantry, and the other for the cavalry; but the two were united into one under Conſtantine. Afterwards, as their power was increaſed, ſo was their number alſo; and there was one appointed for the court, another for Thrace, another for the Eaſt, and another for Illyria. They were afterwards called *comites*, *counts*, and *clariſſimi*. Their power was only a branch of that of the *præfectus prætorii*, who by that means became a civil officer.

Master of Arms (magiſter armorum), was an officer or comptroller under the maſter of the militia.

Master of the Offices (magiſter officiorum), had the ſuperintendance of all the officers of the court; he was alſo called *magiſter officii palatini*, ſimply *magiſter*; and his poſt *magiſteria*.—This officer was the ſame in the weſtern empire with the curopalates in the eaſtern.

Master at Arms, among us, is an officer appointed to teach the officers and crew of a ſhip of war the exerciſe of ſmall arms; to confine and place centinels over the priſoners, and ſuperintend whatever relates to them during their confinement. He is alſo to obſerve that the fire and lights are all extinguiſhed as ſoon as the evening gun is fired, except theſe which are permitted by proper authority, or under the inſpection of centinels. It is likewiſe his duty to attend the gangway when any boats arrive aboard, and ſearch them carefully, together with their rowers, that no ſpirituous liquors may be conveyed into the ſhip unleſs by permiſſion of the commanding officers. In theſe ſeveral duties he is aſſiſted by proper attendants, called his *corporals*, who alſo relieve the centinels and one another at certain periods.

Master of Arts, the firſt degree taken up in foreign univerſities, but the ſecond in ours; candidates not being admitted to it till they have ſtudied in the univerſity ſeven years.

Master-Attendant, is an officer in the royal dockyards, appointed to haſten and aſſiſt at the fitting out or diſmantling, removing, or ſecuring veſſels of war, &c. at the port where he reſides. He is particularly to obſerve, that his majeſty's ſhips are ſecurely moored, and for this purpoſe he is expected frequently to review the moorings which are ſunk in the harbour, and obſerve that they are kept in proper repair. It is alſo his duty to viſit all the ſhips in ordinary, and ſee that they are frequently cleaned and kept in order; and to attend at the general muſters in the dockyards, taking care that all the officers, artificers, and labourers, regiſtered in the navy-books, are preſent at their duty.

Master of the Ceremonies, is an officer inſtituted by King James I. for the more ſolemn and honourable reception of ambaſſadors, and ſtrangers of quality, whom he introduces into the preſence.—The badge of this office is a gold chain and medal, having on one ſide an emblem of peace, with King James's motto; and on the reverſe the emblem of war, with *Dieu et mon droit*. He is always ſuppoſed to be a perſon of good addreſs, and a maſter of languages, and has an appointment of 300l. a-year: he is conſtantly attending at court, and hath under him an aſſiſtant-maſter, or deputy, at 6s. 8d. a-day, who holds his place during the king's pleaſure.

There is alſo a third officer, called *marſhal of the ceremonies*, with 100l. a-year, whoſe buſineſs is to receive and diſtribute the maſter's orders, or the deputy's, for the ſervice; but without their order he can do nothing. This is the king's gift.

Masters of Chancery are uſually choſen out of the barriſters of the common law; and ſit in chancery, or at the rolls, as aſſiſtants to the lord chancellor and the maſter of the rolls. All theſe, ſo late as the reign of Queen Elizabeth, were commonly doctors of the civil law.—To them are alſo committed interlocutory reports, examination of bills in chancery, ſtating of accounts, taxing coſts, &c. and ſometimes, by way of reference, they are empowered to make a final determination of cauſes.

They have, time out of mind, had the honour to ſit in the houſe of lords, though they have neither writs nor patent to empower them; but they are received as aſſiſtants to the lord chancellor and maſter of the rolls. They had anciently the care of inſpecting all writs of ſummons, which is now performed by the clerk of the petty-bag. When any meſſage is ſent from the lords to the commons, it is carried by the maſters of chancery. Before them alſo affidavits are made, and deeds and recognizances acknowledged.

Beſides theſe, who may be called *maſters of chancery ordinary*, (being 12 in number, whereof the maſter of the rolls is reputed the chief), there are alſo maſters of chancery extraordinary, appointed to act in the ſeveral counties of England beyond 10 miles diſtance from London, by taking affidavits, recognizances, &c. for the eaſe of the ſuitors of the court.

Master of the Faculties, an officer under the archbiſhop of Canterbury, who grants licenſes and diſpenſations: he is mentioned in the ſtatute 22 and 23 Car. II. See *Court of Faculties*.

Master Gunner. See Gunner.

Master of the Horſe is reckoned the third great officer of the court, and is an office of great honour and antiquity, and always (when not put in commiſſion), filled by noblemen of the higheſt rank and abilities. He has the management and diſpoſal of all the king's ſtables and bred horſes. He has authority over the equerries and pages, coachmen, footmen, grooms, riders of the great horſe, farriers, and ſmiths. He appoints all the other tradeſmen who work for the king's ſtables; and by his warrant to the avenor, makes them give an oath to be true and faithful. In ſhort, he is intruſted with all the lands and revenues appropriated for the king's breed of horſes, the expences of the ſtable, and of the coaches, litters, &c. He alone has the privilege of making uſe of any of the king's horſes, pages, footmen, &c.; and at any ſolemn cavalcade he rides next the king, and leads a horſe of ſtate. His ſalary is 1276l. 13s. 4d. per annum. There is alſo a maſter of the horſe in the eſtabliſhment of her majeſty's houſehold, with a ſalary of 800l. a-year.

Master of the Houſehold, is an officer under the treaſurer of the houſehold, in the king's gift: his buſineſs is to ſurvey the accounts of the houſehold.—He has 66l. 13s. 4d. a-year wages, and 433l. 6s. 8d. board wages.

Master of the Mint, was anciently the title of him who is now called *warden of the mint*; whoſe office is to receive the ſilver and bullion which comes to the mint to be coined, and to take care thereof. The office of maſter and worker is now diſtinct: and this officer is allowed for himſelf and three clerks 650l. a-year.

Master of the Ordnance. See Ordnance.

Master of the Revels, an officer with an appointment of 100l. a-year, whoſe buſineſs is to order all things relating to the performance of plays, maſques, balls, &c. at court. Formerly he had alſo a juriſdiction of granting licenſes to all who travel to act plays, puppet ſhows, or the like diverſions; neither could any new play be acted at either of the two houſes till it had paſſed his peruſal and licenſe; but theſe powers were afterwards much abridged, not to ſay annihilated, by a ſtatute for regulating playhouſes, till the licenſing plays by the lord chamberlain was eſtabliſhed. This officer has a yeoman with 45l. 11s. 8d. a-year.

Master of the Rolls, a patent officer for life; who has the cuſtody of the rolls and patents which paſs the great ſeal, and of the records of the chancery.

In the abſence of the lord chancellor or keeper, he alſo ſits as judge in the court of chancery; and is by Sir Edward Coke called his *aſſiſtant*.

At other times he hears cauſes in the rolls chapel, and makes orders and decrees. He is alſo the firſt of the maſters of chancery, and has their aſſiſtance at the rolls: but all hearings before him are appealable to the lord chancellor.

He has alſo his writ of ſummons to parliament, and ſits next to the lord chief juſtice of England on the ſecond woolpack. He has the keeping of the parliament rolls, and has the rolls-houſe for his habitation; as alſo the cuſtody of all charters, patents, commiſſions, deeds, and recogniſances, which being made of rolls of parchment gave riſe to the name. Anciently he was called *clerk of the rolls*.

Concerning the authority of the maſter of the rolls to hear and determine cauſes, and his general power in the court of chancery, there were (not many years ſince) divers queſtions and diſputes very warmly agitated; to quiet which it was declared by ſtat. 3. Geo II. cap. 30. that all orders and decrees by him made, except ſuch as by the courſe of the court were appropriated to the great ſeal alone, ſhould be deemed to be valid; ſubject nevertheleſs to be diſcharged or altered by the lord chancellor, and ſo as they ſhall not be enrolled till the ſame are ſigned by his lordſhip.

In his gift are the ſix clerks in chancery, the examiners, three clerks of the petty-bag, and the ſix clerks of the rolls chapel where the rolls are kept. See Rolls, Clerk, &c.

The maſter of the rolls is always of the privy council; and his office is of great profit, though much ſhort of what it has been.

Master of a Ship, an officer to whom is committed the direction of a merchant veſſel, who commands it in chief, and is charged with the merchandiſes aboard.

In the Mediterranean the maſter is frequently called *patron*, and in long voyages *captain*.

It is the proprietor of the veſſel that appoints the maſter; and it is the maſter who provides the equipage, hires the pilots, ſailors, &c. The maſter is obliged to keep a regiſter of the ſeamen and officers, the terms of their contract, the receipts and payments, and, in general, every thing relating to his commiſſion.

Master of a Ship of War, is an officer appointed by the commiſſioners of the navy, to take charge of navigating a ſhip from port to port under the direction of the captain. The management and diſpoſition of the ſails, the working of a ſhip into her ſtation in the order of battle, and the direction of her movements in the time of action, and in other circumſtances of danger, are alſo more particularly under his inſpection. It is likewiſe his duty to examine the proviſions, and accordingly to admit none into the ſhip but ſuch as are ſound, ſweet, and wholeſome. He is moreover charged with the ſtowage: and for the performance of theſe ſervices he is allowed ſeveral aſſiſtants who are properly termed *mates* and *quarter-maſters*.

Master of the Temple. The founder of the order of the templars, and all his ſucceſſors, were called *magni templi magiſtri*; and ever ſince the diſſolution of the order, the ſpiritual guide and director of the houſe is called by that name. See Temple and Templar.

There were alſo ſeveral other officers under this denomination, as maſter of the wardrobe, with a ſalary of 2000l. a-year; maſter of the harriers, with 2000l. a-year; maſter of the ſtaghounds, with 800l. a-year; maſter of the jewel-office, &c. all now aboliſhed.

Master and Servant; a relation founded in convenience, whereby a man is directed to call in the aſſiſtance of others, where his own ſkill and labour will not be ſufficient to anſwer the cares incumbent upon him. For the ſeveral ſorts of ſervants, and how that character is created or deſtroyed, ſee the article Servant. In the preſent article we ſhall conſider, firſt, the effect of this relation with regard to the parties themſelves; and, ſecondly, its effects with regard to others.

1. The manner in which this relation affects either the maſter or ſervant. And, firſt, by hiring and ſervice for a year, or apprenticeſhip under indentures, a perſon gains a ſettlement in that pariſh wherein he laſt ſerved 40 days. In the next place, perſons ſerving ſeven years as apprentices to any trade have an excluſive right to exerciſe that trade in any part of England. This law, with regard to the excluſive part of it, has by turns been looked upon as a hard law, or as a beneficial one, according to the prevailing humour of the times: which has occaſioned a great variety of reſolutions in the courts of law concerning it; and attempts have been frequently made for its repeal, though hitherto without ſucceſs. At common law every man might uſe what trade he pleaſed; but this ſtatute reſtrains that liberty to ſuch as have ſerved as apprentices: the adverſaries to which proviſion ſay, that all reſtrictions (which tend to introduce monopolies) are pernicious to trade; the advocates for it allege, that unſkilfulneſs in trades is equally detrimental to the public as monopolies. This reaſon indeed only extends to ſuch trades, in the exerciſe whereof ſkill is required: but another of their arguments goes much farther; viz. that apprenticeſhips are uſeful to the commonwealth, by employing of youth, and learning them to be early induſtrious; but that no one would be induced to undergo a ſeven years ſervitude, if others, though equally ſkilful, were allowed the ſame advantages without having undergone the ſame diſcipline: and in this there ſeems to be much reaſon. However, the reſolutions of the courts have in general rather confined than extended the reſtriction. No trades are held to be within the ſtatute, but ſuch as were in being at the making of it: for trading in a country village, apprenticeſhips are not requiſite, and following the trade ſeven years is ſufficient without any binding; for the ſtatute only ſays, the perſon muſt ſerves *as* an apprentice, and does not require an actual apprenticeſhip to have exiſted.

A maſter may by law correct his apprentice for negligence or other miſbehaviour, ſo it be done with moderation: though, if the maſter or maſter's wiſe beats any other ſervant of full age, it is good cauſe of departure. But if any ſervant, workman, or labourer, aſſaults his maſter or dame, he ſhall ſuffer one year's impriſonment, and other open corporal puniſhment, not extending to life or limb.

By ſervice all ſervants and labourers, except apprentices, become entitled to their wages; according to agreement, if menial ſervants; or according to the appointment of the ſheriff or ſeſſions, if labourers or ſervants in huſbandry; for the ſtatutes for regulation of wages extend to ſuch ſervants only; it being impoſſible for any magiſtrate to be a judge of the employment of menial ſervants, or of courſe to aſſeſs their wages.

2. Let us now ſee how ſtrangers may be affected by this relation of maſter and ſervant; or how a maſter may behave towards others on behalf of his ſervant, and what a ſervant may do on behalf of his maſter.

And, firſt, the maſter may *maintain*, that is, abet and aſſiſt, his ſervant in any action at law againſt a ſtranger: whereas, in general, it is an offence againſt public juſtice to encourage ſuits and animoſities, by helping to bear the expence of them, and is called in law *maintenance*. A maſter alſo may bring an action againſt any man for beating or maiming his ſervant: but in ſuch caſe he muſt aſſign, as a ſpecial reaſon for ſo doing, his own damage by the loſs of his ſervice; and this loſs muſt be proved upon the trial. A maſter likewiſe may juſtify an aſſault in defence of his ſervant, and a ſervant in defence of his maſter: the maſter, becauſe he has an intereſt in his ſervant, not to be deprived of his ſervice; the ſervant, becauſe it is part of his duty, for which he receives his wages, to ſtand by and defend his maſter. Alſo if any perſon do hire or retain my ſervant, being in my ſervice, for which the ſervant departeth from me and goeth to ſerve the other, I may have an action for damages againſt both the new maſter and the ſervant, or either of them; but if the new maſter did not know that he is my ſervant, no action lies; unleſs he afterwards refuſe to reſtore him upon information and demand. The reaſon and foundation upon which all this doctrine is built, ſeem to be the property that every man has in the ſervice of his domeſtics; acquired by the contract of hiring, and purchaſed by giving them wages.

As for thoſe things which a ſervant may do on behalf of his maſter, they ſeem all to proceed upon this principle, that the maſter is anſwerable for the act of his ſervant, if done by his command, either expreſsly given or implied: *nam qui facit per alium, facit per ſe*. Therefore, if the ſervant commit a treſpaſs by the command or encouragement of his maſter, the maſter ſhall be guilty of it: not that the ſervant is excuſed, for he is only to obey his maſter in matters that are honeſt and lawful. If an innkeeper's ſervants rob his gueſts, the maſter is bound to reſtitution; for as there is a confidence repoſed in him, that he will take care to provide honeſt ſervants, his negligence is a kind of implied conſent to the robbery; *nam qui non prohibet, cum prohibere poſſit, jubet.* So likewiſe if the drawer at a tavern ſells a man bad wine, whereby his health is injured, he may bring an action againſt the maſter; for although the maſter did not expreſsly order the ſervant to ſell it to that perſon in particular, yet his permitting him to draw and ſell it at all is implied a general command.

In the ſame manner, whatever a ſervant is permitted to do in the uſual courſe of his buſineſs, is equivalent to a general command. If I pay money to a banker's ſervant, the banker is anſwerable for it: If I pay it to a clergyman's or a phyſician's ſervant, whoſe uſual buſineſs it is not to receive money for his maſter, and he embezzles it, I muſt pay it over again. If a ſteward lets a leaſe of a farm, without the owner's knowledge, the owner muſt ſtand to the bargain: for this is the ſteward's buſineſs. A wife, a friend, a relation, that uſe to tranſact buſineſs for a man, are *quoad hoc* his ſervants; and the principal muſt anſwer for their conduct: for the law implies, that they act under a general command; and without ſuch a doctrine as this no mutual intercourſe between man and man could ſubſiſt with any tolerable convenience. If I uſually deal with a tradeſman by myſelf, or conſtantly pay him ready money, I am not anſwerable for what my ſervant takes up upon truſt: for here is no implied order to the tradeſman to truſt my ſervant: but if I uſually ſend him upon truſt, or ſometimes on truſt and ſometimes with ready money, I am anſwerable for all he takes up; for the tradeſman cannot poſſibly diſtinguiſh when he comes by my order and when upon his own authority.

If a ſervant, laſtly, by his negligence does any damage to a ſtranger, the maſter ſhall anſwer for his neglect: if a ſmith's ſervant lames a horſe while he is ſhoeing him, an action lies againſt the maſter, and not againſt the ſervant. But in theſe caſes the damage muſt be done while he is actually employed in the maſter's ſervice; otherwiſe the ſervant ſhall anſwer for his own miſbehaviour. Upon this principle, by the common law, if a ſervant kept his maſter's fire negligently, ſo that his neighbour's houſe was burned down thereby, an action lay againſt the maſter; becauſe this negligence happened in his ſervice: otherwiſe, if the ſervant, going along the ſtreet with a torch, by negligence ſets fire to a houſe; for there he is not in his maſter's immediate ſervice, and muſt himſelf anſwer the damage perſonally. But now the common law is, in the former caſe, altered by ſtatute 6 Ann. c. 3. which ordains, that no action ſhall be maintained againſt any in whoſe houſe or chamber any fire ſhall accidentally begin; for their own loſs is ſufficient puniſhment for their own or their ſervant's careleſſneſs. But if ſuch fire happens through negligence of any ſervant (whoſe loſs is commonly very little), ſuch ſervant ſhall forfeit 100l. to be diſtributed among the ſufferers; and, in default of payment, ſhall be committed to ſome workhouſe, and there kept to hard labour for 18 months. A maſter is, laſtly, chargeable if any of his family layeth or caſteth any thing out of his houſe into the ſtreet or common highway, to the damage of any individual, or the common nuiſance of his majeſty's liege people; for the maſter hath the ſuperintendance of all his houſehold. And this alſo agrees with the civil law; which holds, that the *pater familias*, in this and ſimilar caſes, *ob alterius culpam tenetur, ſive ſervi, ſive liberi.*

We may obſerve, that in all the caſes here put, the maſter may be frequently a loſer by the truſt repoſed in his ſervant, but never can be a gainer: he may frequently be anſwerable for his ſervant's miſbehaviour, but never can ſhelter himſelf from puniſhment by laying the blame on his agent. The reaſon of this is ſtill uniform and the ſame; that the wrong done by the ſervant is looked upon in law as the wrong of the maſter himſelf; and it is a ſtanding maxim, that no man ſhall be allowed to make any advantage of his own wrong.

Master Load, in mining, a term uſed to expreſs the larger vein of a metal, in places where there are ſeveral veins in the ſame mountain. Thus it happens, that there are ſeven, ſometimes five, but more uſually three veins or loads, parallel to each other in the ſame mountain. Of theſe the middle vein is the largeſt, and is called the *maſter load*.

Master Wort. See Imperatoria, Botany *Index*.

MASTICATION, the action of chewing, or of agitating the ſolid parts of our food between the teeth, by the motion of the jaws, the tongue, aud the lips, whereby it is broken into ſmall pieces, impregnated with ſaliva, and ſo fitted for deglutition and a more eaſy digeſtion. See Anatomy, N° 104.

MASTICH, a kind of reſin exſuding from the lentiſcus tree; and brought from Chio, in ſmall yellowiſh tranſparent grains or tears of an agreeable ſmell, eſpecially when heated or ſet on fire. See Pistachia.

This reſin is recommended in old coughs, dyſenteries, hæmoptoës, weakneſs of the ſtomach, and in general in all debilities and laxity of the fibres. Geoffroy directs an aqueous decoction of it to be uſed for theſe purpoſes: but water extracts little or nothing from this reſin. Rectified ſpirit almoſt entirely diſſolves it, and the ſolution is very warm and pungent. Maſtich is to be choſen in drops, clear, well ſcented, and brittle.

We meet with a kind of cement ſometimes kept in the ſhops under the name of maſtich. It is compoſed of this gum, and ſeveral other ingredients, and is formed into cakes for uſe. This is intended for the ſervice of lapidaries, to fill up cracks in ſtones, &c. but is by no means to be uſed for any medicinal purpoſes.

MASTICOT, Massicot, or Yellow Lead, is the calx or aſhes of lead, gently calcined, by which it is changed to yellow or lighter or deeper tint, according to the degree of calcination. Maſticot is ſometimes uſed by painters, and it ſerves medicinally as a drier in the compoſition of ointments or plaſters. The maſticot which is uſed by the Dutch as the ground of their glazing, is prepared by calcining a mixture of one hundred weight of clean ſand, forty-four pounds of ſoda and barilla, and thirty pounds of pearl aſhes.

MASTIFF dog, or band dog, (*canis villaticus* or *catenarius*), is a ſpecies of great ſize and ſtrength, and a very loud barker. Manwood ſays, that it derives its name from *maſe-theefe*, being ſuppoſed to frighten away robbers by its tremendous voice. Great Britain was formerly ſo noted for its maſtiffs, that the Roman emperors appointed an officer in this iſland, with the title of *Procurator Cynegii*, whoſe ſole buſineſs was to breed, and tranſmit from hence to the amphitheatre, ſuch as would prove equal to the combats of the place. Strabo, lib. iv. tells us, that the maſtiffs of Britain were trained for war, and uſed by the Gauls in their battles. See Canis, Mammalia *Index*.

MASTIGADOUR, or Slabbering-bit, in the manege, a ſnaffle of iron, all ſmooth, and of a piece, guarded with paternoſters, and compoſed of three halfs of great rings, made into demi-ovals, of unequal bigneſs; the leſſer being encloſed within the greater, which ought to be about half a foot high.

MASULAPATAN, a populous town of Aſia in the Eaſt Indies, and on the coaſt of Coromandel, in the dominions of the Great Mogul. It carried on a great trade, and moſt nations in Europe had factories here; but the Engliſh have now left it, and even the Dutch themſelves have not above a dozen people here to carry on the chintz trade. The inhabitants are Gentoos, who will not feed on any thing that has life; and they had a famous manufacture of chintz, which is greatly decayed ſince the Engliſh left off buying. The Great Mogul has a cuſtomhouſe here; and the adjacent countries abound in corn, tobacco, and timber for building. It is ſeated on the weſt ſide of the bay of Bengal, 200 miles north of Fort St George. E. Long. 81. 25. N. Lat. 16. 30.

MATACA, or Mantaca, a commodious bay in America, on the north coaſt of the iſland of Cuba. Here the galleons uſually come to take in freſh water in their return to Spain. It is 35 miles from the Havannah. W. Long. 85. 6. N. Lat. 25. 0.

MATAMAN, a country of Africa, bounded by Benguela on the north, by Monomotapa on the eaſt, by Caffraria on the ſouth, and by the Atlantic ocean on the weſt. There is no town in it, and the inhabitants live in miſerable huts, it being a deſert country, and but little viſited by the Europeans.

MATAN, or Mactan, an iſland of Aſia in the Eaſt Indian ſea, and one of the Philippines. The inhabitants have thrown off the yoke of Spain; and it was here that Magellan was killed in April 1521.

Cape MATAPAN, the moſt ſouthern promontory of the Morea, between the gulf of Coran and that of Colo-China.

MATARAM, a large town of Aſia, formerly the capital of an empire of that name in the iſland of Java. It is ſtrong by ſituation, and is ſeated in a very fertile, pleaſant, and populous country, ſurrounded with mountains. E. Long. 111. 25. S. Lat. 7. 55.

MATARO, a town of Spain, in Catalonia; ſeated on the coaſt of the Mediterranean, 15 miles north-eaſt of Barcelona, and 35 ſouth-weſt of Gironne. It is a ſmall town, but induſtrious and well peopled; and the environs abound in vineyards, which produce wine much famed for its flavour. It likewiſe contains ſeveral manufactories, and is conſidered as one of the richeſt and moſt active towns in Catalonia. E. Long. 2. 35. N. Lat. 41. 30.

MATCH, a kind of rope ſlightly twiſted, and prepared to retain fire for the uſes of artillery, mines, fireworks, &c.

It is made of hempen-tow, ſpun on the wheel like cord, but very ſlack; and is compoſed of three twiſts, which are afterwards again covered with tow, ſo that the twiſts do not appear: laſtly, it is boiled in the lees of old wines. This, when once lighted at the end, burns on gradually and regularly, without ever going

Quick-Match ‖ Mate.

out till the whole be conſumed: the hardeſt and drieſt match is generally the beſt.

Quick-Match. See *Quick-Match.*

MATCHING, in the wine trade, the preparing veſſels to preſerve wines and other liquors, without their growing ſour or vapid. The method of doing it is as follows: Melt brimſtone in an iron ladle, and when thoroughly melted, dip into it ſlips of coarſe linen cloth; take theſe out, and let them cool; this the wine coopers call a *match.* Take one of theſe matches, ſet one end of it on fire, and put it into the bung-hole of a caſk; ſtop it looſely, and thus ſuffer the match to burn nearly out; then drive in the bung tight, and ſet the caſk aſide for an hour to two. At the end of this time examine the caſk, and you will find that the ſulphur has communicated a violent pungent and ſuffocating ſcent to the caſk, with a conſiderable degree of acidity, which is the gas and acid ſpirit of the ſulphur. The caſk may after this be filled with a ſmall wine which has ſcarce done its fermentation; and bunging it down tight, it will be kept good, and will ſoon clarify: this is a common and very uſeful method; for many poor wines could ſcarce be kept potable even a few months without it.

MATE *of a Ship of War*, an officer under the direction of the maſter, by whoſe choice he is generally appointed, to aſſiſt him in the ſeveral branches of his duty. Accordingly, he is to be particularly attentive to the navigation in his watch, &c. to keep the *log* regularly, and examine the line and glaſſes by which the ſhip's courſe is meaſured, and to adjuſt the ſails to the wind in the fore part of the ſhip. He is to have a diligent attention to the cables, ſeeing that they are well *coiled* and kept clean when laid in the *tier*, and ſufficiently *ſerved* when employed to ride the ſhip. Finally, he is to ſuperintend and aſſiſt at the ſtowage of the hold, taking eſpecial care that all the ballaſt and proviſions are properly ſtowed therein.

Mate ‖ Matera.

Mate of a Merchant Ship, the officer who commands in the abſence of the maſter thereof, and ſhares the duty with him at ſea; being charged with every thing that regards the internal management of the ſhip, the directing her courſe, and the government of her crew.

The number of mates allowed to ſhips of war and merchantmen is always in proportion to the ſize of the veſſel. Thus a firſt-rate man of war has ſix mates, and an Eaſt-India-man the ſame number; a frigate of 10 guns, and a ſmall merchant ſhip, but only one mate in each; and the intermediate ſhips have a greater or ſmaller number, according to their ſeveral ſizes, or to the ſervices on wh ch thay are employed.

Dura *and* Pia MATER, the names given by anatomiſts to the two membranes which ſurround the brain. See Anatomy, N° 120, 130.

MATERA, a conſiderable town of Italy, in the kingdom of Naples, and in the Terra d'Otranto, with a biſhop's ſee, ſeated on the river Canapro. E. Long. 16. 43. N. Lat. 40. 51.

MATERIA MEDICA AND PHARMACY.

INTRODUCTION.

Definition of materia medica;

THAT department of medical ſcience which treats of the nature, effects, and uſes of thoſe remedies that are employed for the prevention or removal of diſeaſe is called Materia Medica. It compriſes the *natural hiſtory* of the articles, or an account of thoſe circumſtances by which they may be diſtinguiſhed, and of the means of procuring and preſerving them; their *chemical hiſtory*, or an account of the changes which they undergo from the action of various reagents, the mode of analyzing them, of ſeparating their moſt uſeful principles, and of aſcertaining their purity; and their *medical hiſtory*, or an account of their ſenſible effects on the animal ſyſtem both in the healthy and morbid ſtate, with their application to the practice of medicine.

2 and of Pharmacy.

The art of collecting, and preſerving the various ſubſtances employed in medicine, and of reducing them to thoſe forms that are beſt ſuited to the various purpoſes for which they are exhibited, is called Pharmacy. This art is practiſed by the trading chemiſt and the apothecary; and at leaſt the principles of it form a neceſſary part of education to every member of the medical profeſſion.

In the preſent edition of our Encyclopædia, it is propoſed to treat of theſe two ſubjects together, ſince they are intimately connected, and when conſidered under the ſame treatiſe, will occupy much leſs room.

3 Arrangement.

We ſhall divide this article into four parts; in the firſt of which we ſhall briefly treat of thoſe articles that are employed to ſupport life, or of diet; in the ſecond we ſhall treat of remedies in general, and ſhall arrange them into claſſes according to their action on the animal economy; in the third we ſhall conſider the methods of preparing them for exhibition, or ſhall lay down the general principles of pharmacy; and in the fourth we ſhall briefly notice each of the articles employed in medicine, whether ſimple or officinal, and mention the moſt important circumſtances neceſſary to be known reſpecting them.

As the limits which have been aſſigned to this article are extremely confined, it cannot be expected that the ſubject will be treated at any great length. Contrary to uſual practice, we ſhall dwell moſt on the general circumſtances of materia medica and pharmacy, and ſhall be as brief on the individual articles, as is conſiſtent with perſpicuity and practical utility.

4 Writers on the materia medica.

We ſhall not at preſent enter on a hiſtorical account of the writers on the materia medica and pharmacy. If we find room for ſuch an account, we ſhall introduce it at the end of this article, where we conceive it would be moſt properly placed. It will be expected, however, that we ſhould mention ſome of the moſt approved

Introduction. proved works on theſe ſubjects, and this we ſhall here do very briefly.

5 Cullen's treatiſe. As one of the principal modern writers on the materia medica, it will be ſufficient to mention the name of Cullen. His work is ſtill conſidered as claſſical, and is in the hands of every medical man. Whatever we may think of the reaſoning and hypotheſis which it contains, and however much we may be fatigued with the prolixity of ſome parts of the work, we ſhall always ſet a juſt value on the uſeful facts and practical remarks with which it abounds. It is to be regretted that Dr Cullen did not prepare a ſecond edition of his materia medica before the infirmities of age had rendered him leſs qualified for the work, as in many reſpects the firſt edition is preferable to the ſecond.

There are three works which Dr Cullen warmly recommended, and which he thought ſo excellent that he wiſhed them to be in the hands of all his readers. Theſe are Dr Lewis's "Experimental Hiſtory of the Materia Medica," as publiſhed in 8vo by Dr Aikin; Bergius's "Materia Medica è regno Vegetabili;" and the "Apparatus Medicaminum" of Profeſſor Murray of Gottingen.

6 Lewis's Experimental Hiſtory. Soon after Dr Cullen publiſhed the ſecond edition of his Materia Medica, a new edition of Lewis by Aikin appeared, ſuperior to the former chiefly in containing the improvements made by the London college in their Pharmacopœia in 1788. Dr Lewis's work is ſtill valuable for the facts which it contains relative to the natural hiſtory of the ſubſtances, and the action of ſeveral chemical agents on them; but from the late changes that have been made in chemical nomenclature, the language in which it is written has already become obſolete.

7 Murray's Apparatus Medicaminum. Profeſſor Murray had publiſhed but a ſmall part of his "Apparatus Medicaminum," when the laſt edition of Cullen's Materia Medica appeared. He, however, lived to complete that part of his work which treats of vegetable ſubſtances, of which five volumes were publiſhed during his life, and a ſixth after his death, by Dr Althof. In this laſt volume an account is given of columba root, anguſtura bark, myrrh, and ſeveral other medicines, which could not properly be introduced into the general arrangement, as the plants from which they are procured were not certainly known.

8 Gmelin's continuation. A continuation of Murray's Apparatus Medicaminum in two volumes, containing an account of mineral ſubſtances, was publiſhed by Profeſſor Gmelin in 1795. It is very good, but will ſcarcely now be conſulted when the improved ſtate of modern chemiſtry has given riſe to the production of ſo many excellent works on the ſame ſubject.

9 Monro's Medical and Pharmaceutical Chemiſtry. In 1788 Dr Donald Monro publiſhed a work on chemiſtry, pharmacy, and the materia medica, in three volumes 8vo, under the title of "Medical and Pharmaceutical Chemiſtry." At the time of its publication, it was the beſt work of the kind in our language, and it is ſtill very valuable, though the late improvements in chemiſtry have in ſome meaſure diminiſhed the utility of the chemical part of the work.

About ten years ago was publiſhed the firſt volume of a ſmall work entitled, A Practical Synopſis of the Materia Alimentaria and Materia Medica, by an anonymous author, who had alſo ſome time before publiſhed the *Theſaurus Medicaminum*. After an interval of ten years this ſynopſis is at length completed by the publication of the ſecond part of the ſecond volume; and we conſider it as one of the moſt uſeful works on the ſubjects on which it treats. Both it and the *Theſaurus* abound with excellent practical obſervations, but the arrangement adopted will in ſome reſpects be conſidered as antiquated. Of this more hereafter. As theſe two works are intimately connected, it is to be wiſhed, that in a ſubſequent edition they ſhould be united into one, in which form they would make two moderate 8vo volumes. 10 Practical ſynopſis and Theſaurus Medicaminum.

11 Murray's Elements. In 1804 Mr Murray, lecturer on chemiſtry and materia medica in Edinburgh, publiſhed his Elements of Materia Medica and Pharmacy, in two volumes, of which the ſecond is chiefly a tranſlation of the new edition of the Edinburgh Pharmacopœia, with ſome uſeful remarks. In his firſt volume, Mr Murray has made ſome ingenious obſervations on the general action of medicines, which, independently of the theory he adopts, we conſider among the moſt valuable parts of his work.

12 Duncan's New Diſpenſatory. Few works have had a more extenſive circulation than the Edinburgh New Diſpenſatory, a work which was founded on the New Diſpenſatory of Dr Lewis publiſhed in 1753. Of this diſpenſatory ſeveral ſucceſſive editions were publiſhed under the direction of Dr Webſter, Dr Duncan, and Dr Rotheram, till in 1803 a new work, under the ſame title, was publiſhed by Dr Andrew Duncan, junior. Of this improved Diſpenſatory we need ſay little; the rapid ſale of three large editions, and the call which has been made for a fourth, ſufficiently evince the opinion which the public has formed of its utility and execution. It is perhaps the moſt complete guide to the practical apothecary which we have in any language.

13 Kirby's tables. In 1805 was publiſhed a ſmall volume containing a tabular view of the Materia Medica by Dr Kirby. This little work is intended as a manual to the young practitioner, and comprehends all the articles of the materia medica that are received into the Parmacopœias of Edinburgh, London, and Dublin, arranged into claſſes; and the mode of preſcribing them is illuſtrated by appropriate formulæ. Owing to the indifferent ſtate of the author's health when this volume was printed, it is disfigured by numerous typographical errors; but theſe are in general only literal; and ſuch as might miſlead the practitioner are corrected in the table of *Errata*.

14 [illegible] Among the beſt foreign publications on materia medica and pharmacy we may enumerate

Arnemann's Therapeia Generalis;
Mirabelli's Apparatus Medicaminum;
Bouillon Lagrange Manual de Pharmacien;
Swediaur's Materia Medica;
Swediaur's Pharmacopœia; and the foreign Pharmacopœias referred to in Duncan's Diſpenſatory.

PART

PART I. DIETETICS.

15 Dietetics. THE ſubject of diet and regimen was much more attended to by the ancient phyſicians than it has been by thoſe of modern times. In the writings of Hippocrates and Celſus we find ſome excellent remarks both on diet in general and on the particular diet that is ſuited to ſick people, and for many centuries theſe authors formed our only guides. Of late indeed, this neceſſary branch of the healing art has been very ſucceſsfully cultivated, and ſeveral valuable works have been publiſhed on the ſubject. Of theſe we ſhall here enumerate a few of the more reſpectable.

16 Writers on diet.

Cullen's Materia Medica, vol. i.
Plenk's Bromatologia;
Synopſis of Materia Alimentaria and Materia Medica, vol. i.
Fordyce on Digeſtion;
Niſbet on Diet;
Halle's Articles on Diet in Encyclopédie Methodique; Dictionary of Medicine;
Beddoes's Hygeia;
Sir John Sinclair's Code of Health and Longevity.

In the brief ſketch that we can here give of dietetics, we ſhall firſt treat of food in general, and then mention moſt of the animal and vegetable ſubſtances that have been or may be employed to ſupport life.

17 Of food in general. All food is either of an animal or vegetable origin. The former is, no doubt, more allied to our nature, and moſt eaſily aſſimilated to its nouriſhment; the latter, though digeſted with more difficulty, is the foundation of the former, as vegetables are the nouriſhment of animals, and all food is therefore properly derived from this ſource. In many reſpects, however, vegetable and animal food differ; and this difference it is proper to remark, according to the various effects it diſplays on different parts of the human ſyſtem. In the choice of vegetable food, a much nicer ſelection is made by man than by any other animal; and his choice is chiefly confined to thoſe of a *mild*, *bland nature*, and of an agreeable taſte. When any other ſubſtances are ſelected, it is entirely for the purpoſe of condiment or medicine. The firſt difference to be obſerved between animal and vegetable food, is with reſpect to their effects on the ſtomach and bowels. In the ſtomach, vegetable food always diſplays a tendency to aceſcency, while animal food, on the contrary, tends towards putrefaction. Hence the former is apt to produce ſymptoms of uneaſineſs, while the latter in moderate quantity is almoſt never felt. In the ſame way, facility of ſolution belongs to vegetable food; while from greater firmneſs of texture, and viſcidity, animal food is apt to oppreſs. Nor does the latter, from its oily texture, always mix eaſily in the ſtomach with other matters; while vegetables unite readily, but frequently continue long on the ſtomach for want of a proper ſtimulus. Similar effects are produced in the bowels by theſe different kinds of food, as well as in the ſtomach. The aceſcency of vegetable food is at all times apt to induce looſeneſs; while the ſame effect is never known to ariſe from animal food, except in a very advanced ſtate of putrefaction. On the contrary, the body is generally kept by it in a regular ſtate; while vegetables, from the leſſer portion of them going into chyle, produce a larger proportion of feculent matter, and lie longer in the bowels from their inactive nature before being expelled.

The nouriſhment conveyed by both kinds of food is much the ſame; but the animal product is in greater quantity, and more eaſily digeſted, while the vegetable retains its more watery nature, with a portion of unaſſimilating ſaline matter, which though introduced, is again expelled by ſome of the excretions. The animal blood is then richer, more elaborated and ſtimulating, and excites a ſtronger action of the ſyſtem than that produced from vegetables. Both products, however, equally take on an alkaleſcent nature in the circulation; for the aceſcency of the vegetable is confined entirely to its action on the ſtomach and bowels. Thus, from animal food a greater ſupply of nouriſhment is received for the wants of the ſyſtem, depending on its greater quantity of oil, and its longer retention in the body than vegetable food. Agreeably to theſe different effects of animal and vegetable food, it is farther to be obſerved, that the latter is more quickly perſpirable than the former. Hence the tendency to obeſity, which ariſes from animal food; while part of the vegetable aliment is very quickly carried off by urine. 18

The combination of a vegetable and animal diet, is certainly beſt ſuited to preſerve a proper ſtate of health and ſtrength. There are few who ſubſiſt entirely upon vegetables, and of theſe few, the conſtitutions are generally feeble, ſickly, and weak, and they are the conſtant victims to complaints of the ſtomach and bowels. Where this method of life is at all practiſed, it is confined to hot climates, where vegetable diet may no doubt be carried to a greater extent without injury. Some nations alſo have gone to the other extreme, and live entirely on animal food; and in a very cold atmoſphere, this may be indulged beyond what would otherwiſe be ſafe for the health of the body, ſo that a mixture of vegetable and animal nouriſhment ſeems beſt fitted for the health of man. But the proportion in which theſe ought to be uſed, is a point equally neceſſary to be enquired into. The benefits that attend animal food are clearly the giving a ſuperior ſtrength and vigour; but, in proportion as it carries this to exceſs, it expoſes the body to dangerous conſequences, and to the production of various diſeaſes. Hence thoſe who exceed in the animal, or what we may term the athletic diet, are ſoon worn out, and fall the victims of the over proportion of ſtrength which ſuch living beſtows. 19

The advantages again of vegetable food, are moſtly of the paſſive kind, and though it is difficult of aſſimilation, yet under certain circumſtances, a tolerable degree of ſtrength and vigour may be acquired from it. It is more favourable for the appetite than animal food, and little injury can ariſe from too much repletion with it. It has many advantages over animal food, as it introduces 20

Dietetics.

troduces no improper acrimony into the juices and counteracts the harmful effects of animal diet. It is to this preference of vegetable food that the French owe their freedom from diſeaſe in a greater degree than the Engliſh: and the beſt rule to ſecure health, perhaps, is to confine infancy and youth moſtly to a vegetable diet; manhood, and the decay of life, to animal food; while near the end of life, the vegetable ſyſtem ſhould again be returned to. But, whatever kind of diet we adopt, a variety in the form of our food, as well as the nature of it, ſhould be attended to it. Thus the conſtant uſe of ſolid nouriſhment, however wholeſome and nutritious, by giving the ſtomach more to do than is neceſſary, muſt be attended with harmful conſequences. In the ſame way a perſeverance in the liquid aliment, however fit by its qualities for conveying chyle into the ſyſtem, could not fail to prove an improper diet, by depriving the ſtomach of that neceſſary ſtimulus from its form, which ſolid food conveys. A mixture, therefore, of ſolid and fluid nouriſhment is abſolutely neceſſary, whatever the nature of that nouriſhment may be, and this proportion muſt be regulated by the different ſituations of different individuals. A man who is ſubjected to much bodily exertion, requires certainly the proportion of ſolid food to exceed, and likewiſe to be taken in the moſt permanent and nutritive ſtate. A man again accuſtomed to little bodily labour, and ſubjected to the eaſe and inactivity of a ſedentary life, ſhould reverſe this plan, and the proportion of liquid ſhould be increaſed. In the uſe of the different kinds of food, the ſame regulations are proper. Where, along with a ſedentary life, the ſtomach rejects much vegetable food, and a tendency to acidity renders its uſe improper, the bad conſequences of an exceſs of animal diet muſt be corrected by giving it in the moſt ſoluble and diluted form. Thus the uſe of ſoups and broths becomes highly proper, as giving the ſufficient ſtimulus of animal food to the ſtomach, and at the ſame time preſenting it in a form by which a conſiderable part quickly paſſes off, and the exceſs of nouriſhment which conſtant animal food would produce is greatly counteracted. It is to this cauſe that we may attribute the little injury which animal food is known to produce in Scotland, and alſo in France, where ſoups are much uſed.

21 Proper quantity of food.

With reſpect to the quantity of food to be actually taken, this muſt be regulated much by the appetite and the ſupply required. The appetite is the great indication of health; and where the ſtomach is in a healthy ſtate, it reliſhes almoſt every kind of nouriſhment that is preſented. This being the caſe, we are entirely to be regulated in the quantity taken in by the appetite. Satiety is the natural conſequence of repletion, and before this takes place, the ſtomach itſelf gives the alarm.

Among popular maxims it has been a common maxim that a ſmall quantity of food is moſt eaſily digeſted, and that we ſhould riſe from table with an appetite. This idea proceeds entirely from the opinion that digeſtion is [illegible] by [illegible] power of the ſtomach. But [illegible] this is not the caſe. It depends entirely on the fluid of the ſtomach, [illegible] by the [illegible]tion of this fluid equally well out of the body as with[illegible] [illegible]

this quantity of food, when taken, by producing a greater ſtimulus or irritation [illegible] in-creaſe the gaſtric fluid, and thus accelerate the proceſs of digeſtion. At the ſame time it muſt be acknowledged that there is in infancy a proper foundation for this reſtriction. The gaſtric fluid in children is more active, and their ſtomach yields more readily to diſtention; the appetite, therefore, will continue longer before the ſenſe of ſatiety takes place: but even here, as the diet is moſtly of a diluted kind, and ſoon paſſes off, we believe that more has been attributed to [illegible] repletion, as the cauſe of diſeaſe in children, than what it deſerves.

22

The proper rule, in all caſes, is that the body ſhould be ſufficiently nouriſhed, whatever the nature or the quantity of the nouriſhment employed may be; and this is beſt determined by the apparent ſtate of the body, and what is again loſt by it, or the quantity of its different diſcharges. The body alſo, we may obſerve, is at all times under the influence of habit, and where it is accuſtomed to be circumſcribed, it is often amazing to find what ſmall quantities of nouriſhment will ſuffice, and even health be preſerved. Of this we have a number of remarkable inſtances brought forward by medical writers. Nor is this confined ſolely to man; the inferior animals ſhow that their bodies can accommodate themſelves to ſimilar circumſtances. This being the caſe, the conſtitution of man is limited in this reſpect leſs, even in civilized life, than what has been alleged. The chief point in health is to guard againſt extremes; for a uniform mode of life, even where errors are conſpicuous, is always leſs dangerous than ſudden exceſs, either of one kind or another.

23 Manner of taking food.

The manner of taking food alſo requires attention. In all ſolid nouriſhment a proper chewing ſhould take place; this is a preparatory and neceſſary ſtep to the action of the fluid in the ſtomach; but this chewing ſhould not be carried, as ſome have adviſed, too far. Something ſhould be left for the ſtomach to do, and this organ will be found improved by exerciſe and by increaſing its active powers, as well as any other part of the body. Hence ſubſtances rather of difficult digeſtion may be at times properly preſented to it.

In his choice of food man is not circumſcribed like the other animals. Its reſpective ſalubrity or perniciouſneſs he can in general judge of only by its taſte. Hence, that his taſte may be as little deceived as poſſible, moſt nouriſhing ſubſtances, we obſerve, are of a bland, mild nature, and contain nothing offenſive to this organ. Hence too there is a certain pleaſure conjoined with the gratification of appetite, which is meant both as an incentive to our taking nouriſhment, and alſo to direct us in the ſelection of it.

From the conſtitution, however, of man, experience ſhows that any nouriſhment, however unfit, may be aſſimilated by habit, and that wholeſome and unwholeſome are often merely relative terms, regulated by the exiſting circumſtances in which individuals are placed.

The deſire for ſolid food is much [illegible] carried to exceſs than that for fluids. Both, where they occur, [illegible] of that artificial one which is created by the uſe of ſti[illegible]

Diætetics. comes increaſed by indulgence; and a habit, of courſe, comes to prevail, which diſtends the ſtomach, relaxes its tone, and deſtroys its elaſticity; in conſequence of which diſorders of this organ ariſe, and a general fulneſs and corpulency in the whole ſyſtem take place.

The manner of taking food, as well as the quantity and quality, requires ſome attention. All extremes in taking food, ſhould be carefully avoided; it ſhould paſs into the ſtomach in a ſlow and regular manner, blended by the proceſs of chewing with a ſufficient quantity of ſaliva to promote its diſſolution in the ſtomach. If hurried over without attention to this, the difficulty of ſolution is increaſed, and the ſtomach is ſuddenly diſtended, and ſatiety produced before it is filled. The meal, therefore, becomes both deficient in quantity, and the food, from the digeſtive organs having more to do, remains longer on the ſtomach than is either neceſſary or proper *.

For more on this ſubject, ſee the articles ALIMENT, FOOD, and DRINK.

After theſe general obſervations on diet, we ſhall take a brief ſurvey of the principal articles employed as food, under the general heads of SOLID FOOD, DRINK, and CONDIMENTS.

A. SOLID FOOD.

I. *FROM THE ANIMAL KINGDOM.*

CLASS I. MAMMALIA. Order 1. PRIMATES.

24 Food derived from quadrupeds. THERE are few animals of this order employed as food. In ſome countries, however, ſeveral ſpecies of the genus ſimia or *ape*, are eaten, particularly

25 Apes. Simia inuus, *the Barbary ape*. S. Beelzebul, *the preacher monkey*. S. Paniſcus, *the four-fingered monkey*.

26 Bats. Some ſpecies of the bat tribe are occaſionally eaten by the natives of warm climates, eſpecially

Veſpertilio vampyrus, *the vampyre bat*.

Order 2. BRUTA.

Several tribes of this order afford nouriſhment to uncivilized nations.

27 Ant-eater. The great ant eater (*myrmecophaga jubata*) is frequently eaten by the American Indians; but its fleſh has a ſtrong and diſagreeable flavour.

28 Armadillo. Moſt ſpecies of daſypus or *armadillo* form an article of diet among the Indians.

29 Rhinoceros. The fleſh of the rhinoceros bicornis, or *two-horned rhinoceros*, is eaten in Abyſſinia; but its fleſh is very ſinewy.

30 Elephant. The fleſh of the elephant is often eaten, both by the Abyſſinians and Hottentots. See ELEPHANT, MAMMALIA *Index*.

Several ſpecies of trichecus, or *walrus*, are eatable, eſpecially

31 Walrus. Trichecus roſmarus, or *arctic walrus*.

Order 3. FERÆ.

From this order mankind have long derived part of their nouriſhment, eſpecially in the earlier periods of ſociety.

32 Seal. The fleſh of the common ſeal (*phoca vitulina*) was, a few centuries ago, ſerved up at the tables of the great in this country; and it ſtill forms the principal ſubſiſtence of the Greenlanders, Icelanders, and Kamtſchadales.

Diætetics.

33 Bear. The brown or black bear (*urſus arctos*) is eaten by the common people in Norway, Ruſſia, and Poland. It is difficult of digeſtion, and is generally ſalted and dried before being uſed.

34 Dog. Of the dog tribe few ſpecies have been employed for the food of man, though the common dog is greedily eaten by the inhabitants of the South-ſea iſlands, and is ſometimes uſed as food in more civilized ſocieties. See DOG, MAMMALIA *Index*.

35 Lion. Of the cat tribe, the fleſh of the lion is conſidered as excellent food by ſeveral nations of Africa, and Kolben prefers it to moſt other animal food.

36 Otter. The common otter (*lutra vulgaris*) is eaten in ſeveral Roman Catholic countries, and conſidered as nearly allied to fiſh. See OTTER, MAMMALIA *Index*.

The young of the ſea otter (*lutra marina*) are ſaid to be delicate eating, not eaſily to be diſtinguiſhed from lamb.

37 Opoſſum. Several ſpecies of *didelphis* or opoſſum are conſidered by the natives of South America as equally good food with the fleſh of the hare or rabbit, eſpecially

Didelphis Virginiana, *the Virginian opoſſum*.

38 Kanguroo. The kanguroo (*macropus major*) forms a chief part of the animal food uſed by the natives of New Holland; but the fleſh is very coarſe.

39 Hedgehog. The common hedgehog (*erinaceus europæus*) is occaſionally uſed as food; and its fleſh is ſaid to be extremely delicate.

Order 4. GLIRES.

40 Porcupine. The common porcupine (*hyſtrix criſtata*) is eaten in Sicily and Malta, and is frequently introduced to the politeſt tables at the Cape of Good Hope.

41 Cavia. Several ſpecies of *cavia* are uſed as food in Guiana, Brazil, and other parts of South America, eſpecially

Cavia cobaya, *the Guinea pig*. C. paca, *the ſpotted cavy*. C. aguti, *the long-noſed cavy*, and C. aperea, *the rock cavy*.

42 Beaver. The fleſh of the beaver (*caſtor fiber*) is employed as food in America, and is ſaid to be good eating. It is preſerved by drying it in the ſmoke.

43 Marmot. The alpine marmot (*arctomys marmota*) affords nouriſhment to the poorer inhabitants of the Tyrol, Savoy, and other parts of the Alps; and, beſides this, three other ſpecies are eatable, viz.

Arctomys monax, *the Maryland marmot*. A. bobac, *bobak*; and A. citellus, *the caſan*, or *earleſs marmot*.

44 Squirrel. Several ſpecies of ſciurus, or *ſquirrel*, may be eaten, eſpecially the common ſquirrel (*ſciurus vulgaris*), which is much uſed in Sweden and Norway, and its fleſh is ſaid to reſemble that of a barn-door fowl.

45 Jerboa. The common jerboa (*dipus jaculus*) is eaten by the Arabs, who eſteem its fleſh among their greateſt delicacies.

46 Hare and rabbit. Moſt ſpecies of lepus, or the *hare* tribe, are uſed as common food, eſpecially

Lepus timidus, *the common hare*, and L. cuniculus, *the rabbit*.

Of theſe the fleſh of the rabbit is ſofter and more digeſtible than that of the hare; but it is not ſo nouriſhing.

* See *Muffet on Diet*.

ing. Wild rabbits are both more digeſtible and more palatable than ſuch as are domeſticated.

Order 5. PECORA.

It is from this order that the principal part of animal food, in civilized countries, is derived. Almoſt all the animals contained in this order form excellent food.

47 Camelus. Some ſpecies of *camelus*, or the camel tribe, are eaten, eſpecially

Camelus dromedarius, *the Arabian camel.* C. glama, *the glama*, whoſe fleſh is ſaid to reſemble mutton.

Of the genus *cervus*, the following ſpecies are moſt uſed, viz.

48 Elk. Cervus alces, *the elk*, eaten in Norway, Lapland, and Sweden, where its fleſh is much eſteemed. It is very nouriſhing, but lies long on the ſtomach.

49 Stag. C. elaphus, *the common ſtag*. The fleſh of this animal, when full grown, is well known under the name of *veniſon*, and is very digeſtible, wholeſome, and nouriſhing. The animal ſhould not be killed till he is above four years old, and the fleſh is fatteſt and beſt flavoured in the month of Auguſt.

50 Rein deer. C. tarandus, *the rein deer.* The fleſh of this ſpecies forms the principal nouriſhment of the Laplanders; the tongues are excellent when ſalted and ſmoked, and the milk is ſweet and nouriſhing.

51 Fallow deer. C. dama, *the fallow-deer.* The fleſh of this ſpecies is a variety of veniſon, and nearly reſembles that of the ſtag. The buck is preferred.

52 Roe-buck. C. capreolus, *the roebuck.* The fleſh of the roebuck is conſidered as inferior to that of the laſt ſpecies.

Of the genus antilope, almoſt all the ſpecies afford excellent food; but the following is moſt generally employed, viz.

53 Chamois. Antilope rupicapra, *the chamois.*

The fleſh of the young ibex (*capra ibex*) is ſaid to be excellent food.

54 Goat. Of the common goat (*capra hircus*) only the young are employed as food; and a roaſted kid is a very common diſh in America and the Weſt Indies. Of goat's milk we ſhall ſpeak hereafter.

55 Sheep. Ovis aries, *the common ſheep*. Mutton is well known to be a highly nutritious and wholeſome meat. It is perhaps more univerſally uſed than any other animal food. *Tup mutton* has ſuch a ſtrong ſmell and diſagreeable taſte, and is, beſides, ſo exceedingly tough and difficult of digeſtion, that it is never eaten but by thoſe who cannot afford to purchaſe mutton of a better quality. *Ewe-mutton*, if it be more than between two and three years old, is likewiſe tough and coarſe. *Wedder-mutton*, or the fleſh of the caſtrated animal, is moſt eſteemed, and is by far the ſweeteſt and moſt digeſtible. *Lamb* being leſs heating and leſs denſe, is better ſuited to weak ſtomachs; but this applies only to the fleſh of lambs that have not been robbed of their blood by repeated bleedings, or reared by the hand with milk adulterated with chalk, in order to make the meat appear white. Such practices to render the food pleaſing to the eye, at the expence of its alimentary properties, cannot be too much reprobated.

56 Ox. Bos taurus, *the common bull and cow.* The fleſh of the bull has a ſtrong diſagreeable ſmell, and is dry, tough, and difficult of digeſtion in the ſtomach. Bull-beef is rarely eaten. But the fleſh of the ox, or caſtrated animal, called *ox-beef*, is a highly nouriſhing and wholeſome food, readily digeſted by healthy perſons, and conſtituting a principal part of the common diet of the inhabitants of this and many other countries. It is the moſt ſtrengthening of all kinds of animal food. Cow-beef is not ſo tender nor ſo nouriſhing, nor ſo digeſtible as ox-beef. Veal is tender and nouriſhing; but not ſo eaſily digeſted, nor ſo well ſuited to weak ſtomachs, as is commonly imagined. It is matter of juſt complaint, that the ſame injurious methods are practiſed in the rearing and management of calves, as have been already noticed under the article LAMB. By ſuch treatment the quality of the fleſh is much depraved. What is called *beef-tea*, is prepared by putting a pound of the lean part of beef, cut into very thin ſlices into a quart of water, and boiling it over a quick fire about five minutes, taking off the ſcum. The liquor is afterwards poured off clear for uſe. This makes a light and pleaſant article of diet for weak and delicate people. On ſome occaſions ſpices may be advantageouſly added to it. Gravy ſoup is very nouriſhing, but is heavy and heating. It is uſed as a clyſter, as well as taken into the ſtomach. Calves-feet jelly is highly nutritious and demulcent.

Beſides the common ox, the following ſpecies are employed as food, viz.

Bos americanus, *the American biſon.* B. moſchatus, *the muſk bull.* B. bubalus, *the buffalo.* B. caffer, *the cape ox*, and B. grunniens, *the yak.*

Order 6. BELLUÆ.

57 Horſe. The fleſh of the horſe may be eaten, but is very coarſe. Mare's milk is often uſed medicinally, but is conſidered as inferior to that of the aſs.

58 Aſſes milk. Aſſes milk is light, and well ſuited to weak ſtomachs. It is commonly employed in conſumptive caſes; and Hoffman recommends it in gout, rheumatiſm, jaundice, debility of the bowels, diſorders of the urinary paſſages, and in fluor albus.

59 Tapir. The fleſh of the tapir (*tapir americanus*) is much eſteemed by the inhabitants of South America, but is inferior to our beef.

60 Hog. The fleſh of the wild boar is denſe, but ſufficiently tender, very nouriſhing, and more ſavoury than that of the domeſtic hog. But as the general properties of both are the ſame, they will be here noticed together. The fleſh of the wild boar is in ſeaſon in the month of October. The head is eſteemed the fineſt part. The fleſh of the young animal is reckoned a great delicacy. *The common or domeſtic boar. The ſow.* The fleſh of the ſow is ſtrong, and makes bad bacon. It is the fleſh of the caſtrated animal that is in common uſe, and that is known by the name of *pork*. On account of the fat or lard with which it abounds, it is not very eaſily digeſted. It is a very ſavoury food, and affords a ſtrong nouriſhment, ſuited to perſons who lead an active or laborious life. The too frequent and long continued uſe of this meat favours obeſity, produces foulneſs of the ſtomach and bowels, and occaſions diſorders of the ſkin. The fleſh of the *ſucking pig* is reckoned a great delicacy, is very nouriſhing; but by reaſon of the thick and ſlimy juice with which it abounds, it is not very readily diſſolved in the ſtomach, and therefore is by no means a proper food for weak and delicate perſons. Bacon is a coarſe and heavy, but

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nutritive food, only fit to be taken in conſiderable quantity by robuſt and labouring people. When it conſtitutes a principal part of the daily diet, it brings on diſorders ſimilar to thoſe which ariſe from the immoderate uſe of pork. In conſequence of the fat or lard with which it abounds, the fleſh of the ſwine tribe is more or leſs laxative. Upon the whole, it may be ſaid of pork, that the occaſional and ſparing uſe of it is ſufficiently ſalutary; but that it cannot be made a principal part of the daily diet, without producing diſorder in many conſtitutions, and particularly in thoſe who are of a melancholic temperament, and lead a ſedentary life.

The fleſh of the different ſpecies of this genus is edible, eſpecially that of the *ſus ſcrofa* and *S. babyruſſa.*

61 Food from birds.

CLASS II. BIRDS. Order 2. PICÆ.

62 Picæ.

Of this order only two ſpecies are generally uſed as food.

Corvus frugilegus, *the rook.* The youngof this bird is very ſimilar to the pigeon, but is rather inferior in flavour and digeſtibility.

P. viridis, *the green woodpecker.* The fleſh of this and ſome other ſpecies is palatable, but of difficult ſolution.

63 Anſeres.

Order 3. ANSERES.

Of this order the principal ſpecies that are eaten belong to the genus *anas*, of which all the ſpecies may be uſed for food; but the following are moſt generally employed, viz. anas cygnus, *the wild ſwan.* A. olor, *the tame ſwan.* A. anſer, *the gooſe.* A. bernicla, *the brent gooſe.* A. moſchata, *the Muſcovy duck.* A. penelope, *wigeon.* A. ferina, *pochard.* A. crecca, *teal.* A. boſchas, *wild duck.* A. domeſtica, *the tame* or *common duck.*

Alca arctica, *puffin.* A. tarda, *the razor-bill.* A. cirrhata, *the tufted auk.*

Pelicanus baſſanus, *the ſoland gooſe.*

Larus marinus, *the black-backed gull.*

Of theſe the ſwan, the gooſe, the wigeon, the teal, the wild and tame duck, are the moſt digeſtible; the barnacle, the puffin, the ſoland gooſe, and the black-backed gull, are very fat, heavy, and have generally a fiſhy taſte.

64 Grallæ.

Order 4. GRALLÆ.

Of this order moſt of the genera furniſh very good and ſavoury food. The following are moſt commonly uſed, viz.

Scolopax ruſticola, *the woodcock.* S. gallinago, *the ſnipe.* S. gallinula, *the jack ſnipe.* S. glottis, *the great plover*, or *green-ſhank.* S. tetanus, *the ſpotted ſnipe.* S. limoſa, *the ſtone plover.* S. lapponica, *the red god-*[illegible]

Tringa pugnax, *the ruff* and *reeve.* T. vanellus, *the lapwing*, or *baſtard plover.* T. cinclus, *the purre.* T. [illegible], [illegible], or *ſea-ſnipe.*

Charadrius marinellus, *the dotterel.* C. pluvialis, *the green plover.* C. œdicnemus, *the thick-kneed buſtard.* C. [illegible], [illegible] *plover.*

[illegible], [illegible]. F. chloropus, *the common water-hen.* F. porphyrio, *the purple water-hen.*

65 Gallinæ.

Order 5. GALLINÆ.

This order furniſhes the principal part of the food which we derive from the claſs of birds. The following ſpecies afford excellent nouriſhment, viz.

Pavo criſtatus, *the peacock.*

Meleagris gallipavo, *the turkey.*

Penelope criſtata, *the quhan.*

Crax alector, *the creſted curaſſow.*

Phaſianus gallus, *the common fowl.* Ph. colchicus, *common pheaſant.*

Numida meleagris, *the Guinea hen.*

Tetrao urogallus, *the wood grouſe.* T. tetrix, *the black cock* or *black game.* T. lagopus, *red game.* T. perdix, *the common partridge.* T. coturnix, *the quail.*

66 Paſſeres.

Order 6. PASSERES.

The following ſpecies of this order may be employed as food, viz.

Columba domeſtica, *the common pigeon*, and C. palumbus, *the ring dove.*

Alauda, *the lark.* All the ſpecies.

Turdus viſcivorus, *the miſſel thruſh.* T. pilaris, *the fieldfare.* T. merula, *the blackbird.*

Loxia curviroſtra, *the ſheldapple*, or *croſsbill.* L. coccothrauſtes, *the groſbeak* or *hawfinch.* L. chloris, *the green finch.*

Emberiza nivalis, *the ſnow bunting.* E. miliaria, *the bunting.* E. hortulana. E. citrinella, or *yellow hammer.*

Fringilla celebs, *the chaffinch.* F. montifringilla, *the brambling*, or *bramble-finch.* F. domeſtica, *the houſe ſparrow.* F. montana, *the tree ſparrow.*

Motacilla modularis, *the hedge ſparrow.* M. ficedula, *the epicurean warbler.* M. œnanthe, *the wheat-ear.* M. rubitra, *the whin-chat.* M. rubicula, *the ſtonechatter.* M. phænicurus, *the redſtart.* M. erithalus, *the redtail.*

Hirundo eſculenta, *the eſculent ſwallow.*

After this enumeration of birds, we muſt ſay ſomething reſpecting the nutritious properties of *eggs.*

67 Eggs.

It is probable that the eggs of all the birds which we have mentioned, and perhaps of moſt others, might be employed as food; but cuſtom and convenience have given the preference to thoſe of the common hen, the guinea hen, and the duck. The fluid contents of an egg conſiſt of the white and the yolk. The former very much reſembles the lymph of the blood, or the coagulable part of milk. The latter, viz. the yolk, is an animal mucilage, compoſed of oil, coagulable lymph and water. It is miſcible with cold water, ſo as to form an emulſion. The oil is ſeparable from the yolk, boiled till it becomes hard, by means of preſſure. *

The eggs of all granivorous birds, and eſpecially of the domeſtic fowl, yield a mild demulcent and ſtrengthening aliment, well ſuited to conſumptive perſons, and ſuch as are exhauſted by immoderate evacuations. Raw eggs are gently laxative, and are found to be ſerviceable in caſes of jaundice and obſtructed liver. A nutritive reſtorative drink is prepared by rubbing the yolks of two or three eggs, and a little white ſugar, with a pint or two of cold water, adding to it afterwards a glaſs of Rheniſh or any other light wine, and a little lemon juice, to give it a flavour. This egg-emulſion without the wine, is a good remedy in coughs, hoarſeneſſes, ſpitting of blood, coſtiveneſs, &c.

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* See C milk.

Both the white and yolk of eggs are very indigeſtible when boiled to hardneſs. Eggs ſhould be ſubjected to as little of the art of cookery as poſſible. The lighteſt as well as the ſimpleſt mode of preparing them for the table, is to boil them only as long as is neceſſary to coagulate ſlightly the greateſt part of the white, without depriving the yolk of its fluidity. This is what is 68 called poaching them; and in this way they ſit well upon moſt ſtomachs.

Class III. AMPHIBIA. Order 1. Reptiles.

This claſs furniſhes but few articles of food, and of theſe the following are the moſt uſually employed, viz.

Teſtudo mydas, *the green turtle*. T. ferox. T. græca, *the land turtle*.

Rana eſculenta, *the edible frog, or green water-frog*.

69 Lacerta agilis, *common green lizard*. L. ſcincus, *the ſcink*.

Order 2. Serpents.

Coluber viper, *the viper*. C. perus, *the adder*.

Of theſe the turtle is well known as a moſt nouriſhing and palatable food. The eſculent frog, though not very nutritious, taſtes much like chicken; the viper 70 and adder are chiefly uſed in ſoups, which are conſidered as great reſtoratives.

Class IV. FISHES.

71 Apodes. It is probable that almoſt all the different ſpecies of fiſh might be employed as food, but the following are chiefly eaten, viz.

Order 1. Apodes.

72 Muræna anguilla, *the common eel*. M. conger, *the conger eel*. Ammodytes tobianus, *the ſand launce*, or *ſand eel*.

Order 2. Jugulares.

Callyonimus lyra, *the gemmous dragonet*. C. dracunculus, *the ſordid dragonet*.

Trachinus draco, *the weever*.

73 Thoracici. Gadus æglefinus, *the haddock*. G. catlarias, *the torſk*, G. morrhua, *the cod-fiſh*. G. barbatus, *the pont*. G. merlangus, *the whiting*. G. pollachius, *the pollack*. G. molva, *the ling*. G. lota, *the burbot*.

Order 3. Thoracici.

Zeus faber, *the dory*.

Pleuronectes hippogloſſus, *the holibut*. P. plateſſa, *the plaiſe*. P. fleſus, *the flounder*. P. limanda, *the dab*. P. ſolea, *the ſole*. P. maximus, *the turbot*.

Chætodon roſtratus, *the jaculator*. C. imperator, *the emperor of Japan*.

Sparus [illegible]

Perca fluviatilis, *the perch*.

Scomber [illegible]

Mullus barbatus, *the red ſurmullet*. M. ſurmuletus, *the ſtriped ſurmullet*.

Trigla lyra, *the piper*.

Order 4. Abdominales.

Cobitis barbatula, *the loach*, or groundling.

Salmo ſalar, *the ſalmon*. S. trutta, *the ſea trout*. S. fario, *the trout*. S. alpinus, *the charr*. S. ſalvelinus, *the ſalmon trout*. S. umbla. S. eperlanus, *the ſmelt*. S. albula, *the whiting*. S. thymallus, *the grayling*.

Eſox lucius, *the pike*.

Mugil cephalus, *the mullet*.

Clupea harengus, *the herring*. C. ſprattus, *the ſprat*; C. aloſa, *the ſhad*. C. encraſicolus, *the anchovy*.

Cyprinus barbus, *the barbel*. C. carpio, *the carp*. C. gobio, *the gudgeon*. C. tinca, *the tench*. C. cephalus, *the chub*. C. leuciſcus, *the dace*. C. rutilus, *the roach*. C. erythrophthalmus, *the rud*. C. alburnus, *the bleak*, and C. brama, *the bream*.

Order 6. Chondropterygii.

Accipenſer ſturio, *the ſturgeon*. A. ruthenus, *the ſterlet*. A huſo, *the iſinglaſs fiſh*.

Raia batis, *the ſkate*.

Petromyzon marinus, *the lamprey*. P. fluviatilis, *the leſſer lamprey*. P. branchialis, *the lampern*, or *pride*. general.

The wholeſomeneſs of fiſh in diet has been much diſputed. According to ſome, it is the moſt delicious food of any; and according to others, it is without ſtrength or ſubſtance. It is certainly not adapted to be the ſole diet of the laborious claſs, but it makes an excellent addition to vegetable food; for inſtance, with potatoes, or other roots, what can be more acceptable than a ſalted or ſmoked herring, to give a reliſh to ſuch inſipid diet? It is ſaid, indeed, that one barrel of ſalted herrings will, in this way, go as far as three barrels of ſalted beef. Freſh fiſh is certainly well calculated for ſedentary people, and thoſe who reſide in towns; and at all events, it is fortunate to have ſuch a reſource for food in a populous country, to be made uſe of when any exigency requires ſuch aid.

The texture of fiſh, in general, is more tender than that of fleſh. They have nothing of a fibrous ſtructure, like fleſh; of courſe, they are more eaſily digeſted than meat, eſpecially ſuch as are not of a viſcid nature.

It is a ſingular circumſtance regarding fiſh, that, though we require vegetables with our meat, we hardly ever take them with fiſh. Cullen ſays, that by way of experiment he has taken apples along with fiſh, but found them to diſturb digeſtion.

The objections to fiſh, however, are numerous. The nouriſhment derived from them it is ſaid, is incomplete; not ſo ſtimulating, nor ſo congenial to the nature of man, as either fowls or quadrupeds; ſome claſſes of them alſo, as ſhell-fiſh, ſalmon, &c. are more indigeſtible than meat; and fiſh, in general, has a ſtronger tendency to putrefaction than meat. But the faults of fiſh are leſſened or corrected by the manner in which they are commonly eaten. In a freſh ſtate, ſauces and pickles of an acid nature are employed with them, and when dried, the action of the ſtomach is promoted by ſalt and ſpices. Fiſh, compared with fleſh, is leſs nouriſhing [illegible] er of digeſtion. Hence many are under the neceſſity, after ſalmon, &c. to have recourſe to a dram of ſome ſpirit or other to carry them off *.

CLASS V. INSECTS.

77 Food from insects.

Of inſects properly ſo called, none are uſed in ſubſtance as food, except various ſpecies of cancer, viz.

Cancer mœnas, *the common crab*. C. pagurus, *the black clawed crab*. C. gammarus, *the lobſter*. C. aſtecus, *the craw fiſh*. C. ſerratus, *the prawn*. C. crangon, *the ſhrimp*, and C. ſqualla, *the white ſhrimp*.

Under this claſs we may rank *honey*, the produce of the bee, which in its general elementary properties agrees with ſugar, to be afterwards noticed. It is, however, rather more heating, and will not agree with many ſtomachs. It is beſt eaten from the comb, as the wax ſeems to correct its unpleaſant effects.

CLASS VI. VERMES. Order 2. MOLLUSCA.

78 Food from Mollusca.

The *ſepia ſepiola*, and the *echinus eſculentus*, are the only edible genera of this order of worms, and even theſe are a coarſe and by no means a nouriſhing food.

Order 3. TESTACEA.

Cardium edule, *the common cockle*.
Oſtrea edulis, *the common oyſter*.
Mytilus edulis, *the eatable muſcle*.
Helix pomatia, *the common ſnail*.

Of theſe, the oyſter and the ſnail are the moſt wholeſome and digeſtible.

As occupying a middle rank between animal and vegetable food, we ſhall here notice *milk* and its various products.

79 Milk.

MILK is the proper and natural food of the young of all animals of the mammalia claſs; and cows milk makes a principal part of the daily diet of a great proportion of the human race, both in the infant and adult ſtate. On account of the abundance of oily and cheeſy matter which it contains, cow's milk is to infants by no means ſo well ſuited as human milk; but as the mode of living in civilized ſociety often depraves the quality of woman's milk, or prevents its ſecretion, cows milk in too many inſtances becomes a neceſſary ſubſtitute. On ſuch occaſions, as it is too heavy to be given alone, it ſhould be diluted with water: and as it is diſpoſed to become more aceſcent than human milk, and from that cauſe to produce gripings and other diſorders of the bowels in young children, it will often be uſeful to mix with it decoctions of animal ſubſtances, ſuch as chicken or veal broth, or decoction of hartſhorn ſhavings; of which laſt two ounces ſhould be boiled in a quart of water, over a gentle fire, till the whole is reduced to a pint; when, after it is become cool, it will be of the conſiſtence of a light jelly. This, mixed with about twice its quantity of cows milk, with the addition of a little ſugar, forms for young ſubjects a proper aliment, approaching nearly to the nature of human milk.

Milk is uſed medicinally in conſumptions, eſpecially in their early ſtage; in gouty affections, after the paroxyſm is gone off, in ſmallpox, diluted with water, as the common drink; in meaſles, eſpecially the malignant kind, diluted in the ſame manner; in gonorrhœa, lues venerea, and during a mercurial ſalivation in cancerous affections; in caſes where mineral and animal poiſons, have been ſwallowed; in caſes of ſtrangury and dyſury from the abſorption of cantharides, &c.; in fluor albus; in many ſpaſmodic and nervous diſorders.

When milk is uſed medicinally, it is often ſerviceable to dilute it with Pyrmont, Seltzer, or ſome other proper mineral water; and to prevent acidity, and make it ſit eaſier on the ſtomach, limewater, and ſome of the diſtilled aromatic waters, are occaſionally mixed with it. To obviate coſtiveneſs, which milk is apt to induce, it is often proper to mix brown ſugar, or magneſia with it, to boil it with oatmeal, veal broth, &c.

In general, milk is improper in inflammatory fevers, unattended with puſtulous eruptions; in bilious fevers; in ſcrophulous caſes; and in rickets.

The following are the principal products and preparations of milk in dietetic and medicinal uſe; cream and butter are well known; nor can it be neceſſary to notice how much they diſorder the ſtomach and bowels when taken too freely.

Curds taken in conſiderable quantity, are highly oppreſſive to the ſtomach, and not unfrequently prove the cauſe of obſtructions and inflammations of the bowels.

80 Cheeſe.

Cheeſe varies according to the kind of milk from which it is prepared, according to the quantity of oil and whey which the coagulable matter contains, and laſtly according to its age. In general, it is an aliment ſuited only to ſtrong ſtomachs, and to ſuch perſons as uſe great and conſtant exerciſe. In the higher orders of ſociety, it is uſed chiefly as a condiment. Toaſted cheeſe is not eaſily digeſted by weak ſtomachs; and for thoſe who can be hurt by indigeſtion, or heated by a heavy ſupper, it is a very improper diet *.

81 Butter milk.

Butter-milk is milk which has been deprived of its oily matter by churning or agitation. It is nouriſhing, cooling, and diluent. It is uſed in cachexies, atrophies, conſumptions, &c.

Whey is the watery, ſaccharine part of milk, freed in a great meaſure from the butyraceous and caſeous matter. It is lightly nutritive, diluent, aperient, and diuretic. It is given in conſumptions, dyſenteries, jaundice, &c. alone, or mixed with mineral waters, and ſometimes impregnated with the juices of medicinal herbs. Wine whey, tartar whey, muſtard whey, will be particularly noticed in their proper places.

Sugar of milk is a ſaline ſubſtance, obtained from the whey by evaporation. It has been properly called the eſſential ſalt of milk. It has been much extolled by ſome writers as a remedy in conſumptions; but as it is contained in whey, it it evident that preparation muſt poſſeſs all its virtues, and therefore that the trouble of obtaining it ſeparate muſt be unneceſſary †.

II. *FROM THE VEGETABLE KINGDOM.*

82 Of vegetable food in general.

Vegetable food is more ancient than any other. As forming the food of animals, it is the foundation of all our nouriſhment, for by it thoſe animals are nouriſhed, which in turn afford ſuſtenance to man. Indeed there are no circumſtances under which a diet of animal food ſhould be ſolely employed. This has been confirmed by every experiment made; and the confinement of a perſon only for a few days to this mode of living, has induced ſuch ſymptoms as obliged him to deſiſt. Beſides this, by ſtimulating to an extreme degree, the ſprings of life are by animal diet urged on too faſt; and preternatural, and of courſe weakening exertions of the ſyſtem enſue, which induce, from their exceſs, an early decay. Thus childhood is prematurely uſhered by it into manhood; and the powers of manhood, ſoon exhauſted, diſplay the infirmities and progreſs of age, at a period when vigour and ſtrength ſhould ſtill be in perfection. A diet of vegetable food is, on the contrary, conducive to long life. It neither accelerates the vital energy, nor ripens the fruit before its time, but with a ſlow and regular ſtep brings forwards the different ſtages in their due ſeaſon, and with all the advantages which their proper maturity ought to confer on them. At the ſame time, while we thus point out the good effects of a vegetable diet, in arreſting the progreſs of life, and giving a greater permanence to exiſtence, we by no means approve of it as a diet to be entirely truſted to.

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* Code of Health and Longevity, vol. i. p. 4[illegible]7.

* See *Cheeſe*.

† *Synop*[illegible] *Mat. A*[illegible] *ment. and Me*[illegible] vol. i.

Declaimers on the excluſive uſe of vegetable diet have not taken into view the various and new circumſtances of ſituation in which man is now placed. He is no longer the child of nature, nor the paſſive inhabitant of one genial ſpot, as when he was firſt formed. He is now a citizen of the world at large; exertion and toil are his conſtant attendants, and he requires a more ready and aſſimilated nouriſhment than vegetable food can convey. In many ſituations alſo, the vigour of his ſyſtem is weakened by extremes of temperature, which demand, to counteract them, the moſt ſtimulant and invigorating food he is capable of acquiring. The excellence of vegetable food uſed alone is therefore confined to a mild temperature and a paſſive ſtate, and there it certainly deſerves that preference which humanity and philoſophy have beſtowed upon it. Conſidering vegetable food as conveying a nouriſhment inſufficient for our preſent civilized ſituation, we ſhall next ſtate the inconveniences that attend its being uſed in exceſs. The firſt inconvenience of vegetable food already noticed, is its conſtant tendency to aceſcency; but this is hurtful only when it takes place to a morbid degree. If a natural tendency to aceſcency prevails in the ſtomach, as a ſtep towards aſſimilation, it cannot fail to be noxiouſly increaſed by the ſole uſe of vegetables; and the counteracting of this ſtate, or checking the tendency to fermentation, muſt be the great ſecret in the regulation of vegetable diet. This ſecret no doubt depends on the preventing, by our choice of vegetables, exceſs in the proportion of fermentable or ſaccharine matter, and in exciting the action of the ſtomach, ſo that the vegetable food may not be too long retained upon it.

The next inconvenience alleged againſt vegetable diet is its difficulty of aſſimilation. That vegetable aliment is more difficult in being reduced to nouriſhment, ſeems generally admitted, and in the end it produces a greater quantity of fæces. When received into the ſtomach it is likewiſe ſpecifically lighter than the gaſtric fluids. Hence it floats near the top of the ſtomach, and cauſes irritations. This uneaſineſs is not felt for ſome time after its reception, but afterwards it begins to operate on the upper orifice of the ſtomach. The difficulty, however, of aſſimilation that attends vegetable food, may be got the better of by a proper ſelection of it; and it will alſo be chiefly felt in weak ſtomachs, and will by no means affect the vigorous and robuſt.

A third inconvenience of vegetable food is its extrication of a conſiderable quantity of air, by which the ſtomach becomes diſtended, often to an enormous degree, and much uneaſineſs is produced in the adjacent organs. This extrication of air is common to all vegetables; it varies, however, extremely in different kinds of them; and it is from this circumſtance that the flatulence and torpor is experienced, which ſucceeds a full meal of them. Hence all vegetables that contain much of it ſhould undergo a previous preparation before being uſed as food.

Theſe, then, are the chief inconveniences attending a vegetable regimen; while on the contrary, to counterbalance them, this ſpecies of diet is always found to promote or ſharpen the appetite, and to keep the ſtomach in an active ſtate. Neither are any conſtitutional diſorders the conſequence of it, as happens from animal food, for whatever morbid ſymptoms ariſe under its uſe are confined almoſt entirely to the ſtomach and bowels, and ſeldom carry any hurtful effects to the ſyſtem at large. Neither do any evils ariſe from occaſional exceſſes in its uſe; and the miſchiefs of repletion or overfulneſs are avoided by it, unleſs in caſes of extreme indolence, or where a continued courſe of intemperance is purſued as to the quantity taken. By its moderate ſtimulus it counteracts the diſpoſition to an inflammatory ſtate, and in many caſes proves highly ſerviceable, in checking the violence, and arreſting the progreſs of many conſtitutional diſeaſes. Independently of its nature, it is of great importance to the ſtomach, by giving that proper diſtention which this organ requires in order to its healthy action.

The wiſdom of nature has provided that the extent of vegetable food ſhould be much greater than that of animal food, as the former is the foundation of nouriſhment for all the animated creation. Hence we find that there is ſcarcely any vegetable that does not afford nouriſhment to ſome animal; and there are many which, though naturally of a deleterious quality, can, by proper preparation, be converted into nouriſhment to man. Man, more than any other animal, is diſtinguiſhed as to the choice of food which he makes; and in this ſelection he is generally determined by his taſte, between which and the ſtomach nature has eſtabliſhed ſuch a ſympathy, that what is diſagreeable to the one, is ſeldom very digeſtible by the other. Hence inclination is to be particularly ſtudied in every caſe of weakneſs of the ſtomach.

Among the other properties of vegetable food, it has been eſpecially conſidered by all authors as having moſt influence on the powers of the mind, and in preſerving a delicacy of feeling, a livelineſs of imagination, and an activeneſs of judgement; but in proportion to theſe ſuperior qualities, it muſt be obſerved, this ſtate of body is equally the attendant of timidity, fluctuation, and doubt. Animal food, in the other extreme, gives a ſtrong vigour and firmneſs of purpoſe, fitted for the moſt active exertions of life. By a mixture of diet theſe two extremes come to be counteracted; the body poſſeſſes a proper [illegible] vigour; and, correſpondent to it, the mind diſplays a firmneſs and capacity ſuited to every valuable purpoſe. The diet, then, Dietetic [illegible] this [illegible] may be properly called temperance, without limiting the individual to an exact measure of [illegible] or of flesh, or tying him up by the absurd and sickly system of Cornaro; and this state will be properly regulated by the experience and feelings of each individual, both in regard to the quantity and quality of his nouriſhment.

In the uſe of vegetable food, as well as animal, attention muſt be paid both to the proportion of it taken, and alſo to the ſtate in which it is uſed. The firſt of theſe muſt be regulated by the three circumſtances of ſeaſon, way of life, and climate. With reſpect to the firſt—in ſummer the quantity of vegetable food ſhould be always increaſed, whatever our habits may be; the propriety of this is evidently pointed out by nature, from its abundance at this period. This increaſe of vegetable food is alſo the more neceſſary if the appetite is naturally keen and healthy, as a more ſtrongly nouriſhing aliment would at this time expoſe to all the effects of putreſcency, which the increaſe of the vegetable diet will, on the contrary, counteract.

The way of life muſt alſo regulate a good deal the proportion of vegetable nouriſhment. An eſſential circumſtance in the uſe of all diet, as we formerly remarked, is the production of ſuch a diſtention of the ſtomach and bowels as may enable them to act properly on their contents. In the ſedative and inactive, it is particularly deſirable that this diſtention ſhould be produced by food of a leſs nouriſhing kind, and that no more nouriſhment be received than what the wants of the ſyſtem require. Hence in theſe caſes, a vegetable diet is to be preferred, while, in the active and laborious, the plan ſhould be reverſed.

It is a fact ſufficiently eſtabliſhed, that the proportion of vegetable food ſhould be in a great meaſure regulated by the climate, as there is no doubt that the mortality of warm climates is aggravated by the uſe of too much animal food; and that a diet of a vegetable and aceſcent nature with a large proportion of condiment, ſuch as we find uſed by the inhabitants of thoſe countries, is beſt ſuited to the preſervation of health; for by this exceſs of condiment, the morbid effects on the ſtomach and bowels, natural to vegetable food, are counteracted, and the chyle formed from them paſſes into the circulation in a proper ſtate for ſupporting the body in ſuch a ſituation. On the other hand, in a colder region, a permanence of nouriſhment is required, which animal food particularly conveys; and as this nouriſhment is leſs apt to diſorder the ſtomach or bowels, no great portion of condiment is neceſſary, either as a ſtimulus to the organ, or in order to avoid any hurtful conſequences that may ariſe. The proportion, therefore, of vegetable food is clearly pointed out to be ſmall, and chiefly of the farinaceous or leaſt aceſcent kind.

The ſtate in which vegetable food is uſed is of equal importance with the proportion of it taken. Thus vegetable food particularly requires to be uſed in a freſh ſtate, for by drying, heat, many kinds of vegetables loſe their peculiar flavour, their taſte and ſmell, and in conſequence they become indigeſtible; this is particularly the caſe with the jellies, with fruits, and with [illegible]

[illegible] general remarks we ſhall ſubjoin a catalogue of [illegible] Bryant's Flora Diætetica, diſtributed according to the method of that author, into roots, ſhoots, ſtalks, leaves, flowers, berries, ſtone fruit, apples, legumens, grain, nuts, and funguſes.

83 Eſculent roots.

I. ESCULENT ROOTS.

Sect. 1. Roots now or formerly made uſe of as Bread.

Arum colocaſia, *Egyptian arum*. A. eſculentum, *eatable arum*. A. peregrinum, *edders*.
Calla paluſtris, *water dragons*.
Convolvulus batatas, *Spaniſh potatoes*.
Dioſcorea ſativa. D. alata. D. bulbifera, *Indian yams*.
Jatropha maniot, *Indian bread*.
Nymphæa lotus, *Egyptian lotus*.
Sagittaria ſagittifolia, *common arrowhead*.
Solanum tuberoſum, *common potatoes*.
Yucca glorioſa, *Adam's needle*.
Polygonum divaricatum, *eaſtern buckwheat*.

Sect. 2. Roots occaſionally eaten as Condiments, or for other family purpoſes.

Amomum zingiber, *common ginger*.
Allium cepa, *common onion*. A. aſcalonicum, ſhallot. A. ſcordopraſum, *rokambole*.
Apium petroſelinum, *common parſley*.
Bunium bulbocaſtanum, *earth nut* or *pig-nut*.
Beta rubra, *red beet*.
Braſſica rapa, *common turnip*. B. rapa punicea, *purple-rooted turnip*. B. rapa flaveſcens, *yellow rooted turnip*. B. rapa oblonga, *long-rooted turnip*.
Campanula rapunculus, *rampion*.
Cochlearia armoracia, *horſe radiſh*.
Carum carui, *caraway*.
Cyperus eſculentus, *ruſh nut*.
Daucus carota, *carrot*.
Eryngium maritimum, *ſea holly*, or *eryngo root*.
Guilandina maringa, *Ceylon guilandina*.
Helianthus tuberoſus, *Jeruſalem artichoke*.
Ixia chinenſis, *ſpotted ixia*. I. bulbifera, *bulb-bearing ixia*.
Lathyrus tuberoſus, *peas earth nut*.
Orobus tuberoſus, *heath peas*.
Orchis maſcula, *male orchis*.
Paſtinaca ſativa, *the parſnip*.
Raphanus ſativus, *the radiſh*.
Scorzonera hiſpanica, *viper's graſs*.
Sium ſiſarum, *ſkirrets*.
Lilium martagan, *martagan lily*.
Tulipa geſneriana, *common tulip*.
Tragopogon pratenſe, *yellow goat's-beard*. T. porrifolium, *purple goat's-beard*.

Eſcul ſhoots ſtalks

II. ESCULENT SHOOTS, STALKS, SPROUTS, AND PITHS.

Sect. 1. Shoots and Stalks.

Aſparagus officinalis, *aſparagus*.
Anethum azoricum, *ſweet azorian fennel*.
Angelica archangelica, *angelica*.
Arctium lappa, *burdock*.
Aſclepias ſyriaca, *greater Syrian dogsbane*.
Apium graveolens, *ſmallage*. A. dulce, *garden celery*.

Campanula

etetics.

Campanula pentagonia, *Thracian bell-flower.*

Cynara cardunculus, *cardoon, or chardoon.*

Carduus marianus, *milk thiſtle.*

Cnicus cernuus, *Siberian nodding cnicus.*

Chenopodium bonus henricus, *Engliſh mercury.*

Convolvulus ſoldanella, *ſea bindweed.*

Cucubalus behen, *ſpatling poppy.*

Epilobium anguſtifolium, *roſebay willow herb.*

Humulus lupulus, *wild hops.*

Onopordum acanthium, *cotton thiſtle.*

Rheum rhaponticum, *rhapontic rhubarb.*

Smyrnium olus atrum, *common alexanders.* S. perfoliatum, *round leaved alexanders.*

Saccharum officinarum, *ſugar-cane.*

Sonchus alpinus, *mountain ſow thiſtle.*

Tamus communis, *black briony.*

Tragopogon pratenſe, *yellow goat's-beard.* T. porrifolium, *purple goat's-beard.*

Sect. 2. SPROUTS and PITHS.

Areca oleracea, *cabbage-tree.*

Arundo bambos, *bamboo cane.*

Braſſica oleracea, *common cabbage.* B. O. viridis, *green ſavoy cabbage.* B. O. ſabauda, *white ſavoy cabbage.* B. botrytis, *cauliflower.* B. B. alba, *white cauliflower.* B. B. nigra, *black cauliflower.* B. ſabellica, *Siberian brocoli.* B. præcox, *early batterſea cabbage.* B. rapa, *common turnip.*

Cyperus papyrus, *paper ruſh.*

Cycas circinalis, *ſago palm tree.*

Portulaca oleracea, *purſlane.* P. latifolia, *broad-leaved garden purſlane.*

Smilax aſpera, *red berry, rough pine-weed.*

85 ulent ves.

III. ESCULENT LEAVES.

Sect. 1. COLD SALADS.

Apium petroſelinum, *parſley.* A. criſpum, *curled-leaved parſley.*

Allium cepa, *common onion.* A. ſchœnopraſum, *cives.* A. oleraceum, *wild garlic.*

Artemiſia dracunculus, *taragon.*

Alſine media, *common chick-weed.*

Borago officinalis, *borage.*

Cacalia ficoides, *fig marigold-leaved cacalia.*

Cichorium endivia, *endive.* C. endivia criſpa, *curled-leaved endive.*

Cochlearia officinalis, *ſcurvy graſs.*

Eryſimum alliaria, *Jack by the hedge.* E. barbarea, *winter creſs* or *rocket.*

Fucus ſaccharinus, *ſweet fucus* or *ſea belts.* F. palmatus, *handed fucus.* F. digitatus, *fingered fucus.* F. eſculentus, *edible fucus.*

Hypochæris maculata, *ſpotted hawk-weed.*

Lactuca ſativa, *lettuce.*

Leontodon taraxacum, *dandelion.*

Lepidium ſativum, *garden creſs.* L. virginicum, *Virginian ſciatic creſs.*

Mentha ſativa, *curled mint.* M. viridis, *ſpearmint.*

Oxalis acetoſella, *wood ſorrel.*

Poterium ſanguiſorba, *garden burnet.*

Primula veris, *common cowſlips,* or *paigles.*

Rumex ſcutatus, *round leaved ſorrel.* R. acetoſa, *common ſorrel.*

Salicornia europea, *jointed glaſſwort,* or *ſaltwort.*

Scandix cerefolium, *common chervil.* S. odorata, *ſweet cicely.*

Dietetics.

Sedum reflexum, *yellow ſtonecrop.* S. rupeſtre, *St Vincent's rock ſtonecrop.*

Siſymbrium naſturtium, *water-creſs.*

Sinapis alba, *white muſtard.*

Tanacetum balſamita, *coſtmary.*

Valeriana locuſta, *lamb's lettuce.*

Veronica beccabunga, *brooklime.*

Ulva lactuca, *green laver.*

Sect. 2. BOILING SALADS.

Amaranthus oleraceus, *eſculent amaranth.*

Arum eſculentum, *Indian kale.*

Atriplex hortenſis, *garden orach.* A. hortenſis nigricans, *dark green garden orach.* A. hortenſis rubra, *red garden orach.*

Anethum fœniculum, *common fennel.* A. dulce, *ſweet fennel.*

Braſſica oleracea, *cabbages.* B. napus, *colewort.*

Chenopodium bonus henricus, *v. ſ.*

Cnicus oleraceus, *round-leaved meadow thiſtle.*

Corchorus olitorius, *common Jews mallow.*

Crambe maritima, *ſea colewort.*

Jatropha manihot, *caſſava.*

Malva rotundifolia, *dwarf mallow.*

Mentha viridis, *ſpearmint.* See Sect i.

Phytolacca decandra, *American nightſhade.*

Ranunculus ficaria, *pilewort.*

Raphanus ſativus, *common radiſh.*

Salvia ſclarea, *garden clary.*

Spinacia oleracea, *common ſpinach.* S. O. glabra, *ſmooth ſpinach.*

Thea bohea, *bohea tea.* T. viridis, *green tea.*

Urtica dioica, *common ſtinging nettle.*

Sect. 3. POT HERBS.

86 Pot herbs.

Apium graveolens, *celery.* A. petroſelinum, *parſley.*

Allium porrum, *leeks.*

Braſſica oleracea, *cabbages.*

Beta vulgaris alba, *white beet.*

Crithmum maritimum, *rock ſamphire.*

Hyſſopus officinalis, *common hyſſop.*

Oxalis acetoſella, *wood ſorrel.*

Ozymum baſilicum, *ſweet ſcented baſil.*

Origanum marjorana, *common marjoram.* O. marjorana tenuifolia, *fine leaved ſweet marjoram.* O. heracleoticum, *winter ſweet marjoram.* O. onites, *pot marjoram.*

Picris echioides, *common ox-tongue.*

Roſmarinus officinalis, *common roſemary.* R. hortenſis, *garden roſemary.*

Salvia officinalis, *green* and *red ſage.* S. minor, *tea ſage.*

Satureja hortenſis, *ſummer ſavory.* S. montana, *winter ſavory.*

Scandix cerefolium, *common chervil.* S. odorata, *ſweet cicely.*

Sonchus oleraceus, *common ſow thiſtle.*

Thymus vulgaris, *common thyme.* T. maſtichinus, *maſtic thyme.*

87 Eſculent flowers.

IV. ESCULENT FLOWERS.

Calendula officinalis, *common marigold.*

[illegible], [illegible] marygold.
[illegible]
[illegible]
Carlina acaulis, *dwarf carline thiſtle.*
[illegible]
[illegible] *artichoke.* C. hor-[illegible]
[illegible]
[illegible]
[illegible]
Tropæolum majus, *Indian creſs.* T. minus, *ſmaller Indian creſs.*

V. ESCULENT BERRIES.

Sect. 2. Indigenous or Native BERRIES.

Arbutus uva urſi, *bear-berry.* A. alpina, *mountain* [illegible]. A. unedo, [illegible].

Berberis vulgaris, *common barberry.*

Cratægus aira, *white beam-tree.* C. terminalis, *maple-*[illegible].

[illegible] ſylveſtris, *wood ſtrawberry.* F. northumbrienſis, *Northumberland ſtrawberry.* F. im-[illegible], [illegible]. F. [illegible], [illegible] *wood ſtrawberry.* F. pratenſis, *Swediſh green ſtrawberry.* [illegible] F. [illegible] hermaphrodita, *royal hautboy.* F. chinenſis, *Chineſe ſtrawberry.* F. virginiana, [illegible]. F. V. coccinea, *Virginian ſcarlet-bloſſomed ſtrawberry.* F. V. campeſtris, *wild Virginian ſtrawberry.* F. chiloenſis, *Chili ſtrawberry.* F. C. devanenſis, *Devonſhire ſtrawberry.*

Juniperus communis, *common or Engliſh juniper.* J. [illegible], [illegible] *juniper.*

Ribes rubrum et album, *red* and *white currants.* R. nigrum, *black currants.* R. groſſularia, *gooſeberries.*

Roſa canina, *dog's roſe, or hep-buſh.*

Rubus idæus, *raſpberry.* R. I. albus, *white raſpberry.* R. I. lævis, *ſmooth-ſtalked raſpberry.* R. cæſius, *dewberry.* R. fruticoſus, *common bramble.* R. chamæmorus, *cloudberry.* R. arcticus, *ſhrubby ſtrawberry.*

Vaccinium myrtillus, *blackworts*, or *bilberry.* V. vitis idæa, *redworts.* V. oxycoccos, *cranberry.*

Sect. 2. Foreign BERRIES, often raiſed in gardens and ſtoves.

Annona muricata, *ſour ſop.* A. reticulata, *cuſtard apple.* A. ſquamoſa, *ſweet ſop.*

Bromelia ananas, *pine apple.* B. ananas pyramidato fructu, *ſugar-loaf pine-apple.* B. karatas, *the penguin.*

Cactus opuntia, *prickly pear.* C. triangularis, *true prickly pear.*

Capſicum annuum, *annual Guinea pepper.* C. fruteſcens, *perennial Guinea pepper.*

Carica papaya, *the papaw or papa.* C. [illegible], *pear-ſhaped papaw.*

Chryſophyllum caineto, *ſtar-apple.* C. glabrum, *ſapadilio*, or *Mexican medlar.*

Citrus medica, [illegible]. C. limon, *common lemon.* C. americana, *the lime tree.* C. aurantium, *common orange.* C. [illegible], *ſhaddock orange.*

Crateva marmelos, *Bengal quince.*

Dioſpyros lotus, *Indian date plum.* D. virginiana, *piſhamin plum.*

Ficus carica, *common fig.* F. humilis, *dwarf fig.* F. caprificus, *hermaphrodite fruited fig.* F. fructu fuſco, *brown-fruited fig.* F. Fructu violaceo, *purple-fruited fig.* F. [illegible], [illegible], or [illegible] *fig.*

Garcinia mangoſtana, *mangoſteen.*

Morus nigra, *black fruited mulberry.* M. rubra, *red-fruited mulberry.* M. alba, *white-fruited mulberry.*

Muſa paradiſiaca, *plantain tree.* M. ſapientum, *banana*, or *ſmall-fruited plantain.*

Meſpilus germanica, *medlar.*

Mammea americana, *the mammee.*

Malpighia glabra, *ſmooth-leaved Barbadoes cherry.* M. punicifolia, *pomegranate-leaved malpighia.*

Paſſiflora maliformis, *apple-ſhaped granadilla.* P. laurifolia, *bay-leaved paſſion flower.*

Pſidium pyriferum, *pear guava*, or *bay plum.* P. pomiferum, *apple guava.*

Solanum lycoperſicum, *love apple.* S. melongena, *mad apple.* S. ſanctum, *Paleſtine nightſhade.*

Sorbus domeſtica, *true ſervice tree.*

Trophis americana, *red-fruited bucephalon.*

Vitis vinifera, *common grapes.* V. apyrena, *Corinthian currants.*

VI. ESCULENT STONE FRUIT.

Sect. 1. STONE FRUIT of Europe.

Amygdalus perſica, *the peach.* A. nuciperſica, *the nectarine.*

Cornus maſcula, *male cornel*, or *cornelian cherry.*

Olea Europæa, [illegible]. O. [illegible], *wild olive.*

Prunus armeniaca, *the apricot.* P. cerasus, [illegible] *cherry.* P. domeſtica, *the plum tree.* P. inſititia, *the bullace tree.*

Rhamnus zizyphus, *common jujube.*

Sect. 2. STONE FRUIT exotic.

Chryſobalanus icaco, *cocoa plum.*
Coccoloba uvifera, *ſea-ſide grape.*
Cordia myxa, [illegible], or [illegible] *plum.* C. ſebeſtena, *rough-leaved ſebeſten.*
Corypha umbraculifera, *umbrella palm.*
Elais guineenſis, *oil palm.*
Eugenia jambos, *Malabar plum.*
Grias cauliflora, *anchovy pear.*
Laurus perſea, *avigato pear.*
Mangifera indica, *mango tree.*
Phœnix dactylifera, *common date.*
Rhamnus jujuba, *Indian jujube.*
Spondias lutea, *yellow Jamaica plum.*

VII. ESCULENT APPLES.

Sect. 1. Apples of Herbaceous Plants.

Cucumis melo, *muſk melon.* C. melo albus, *Spaniſh white melon.* C. M. lævis, *ſmooth green fleſhed melon.* C. M. flavus, *yellow winter melon.* C. M. parvus, *ſmall Portugal muſk melon.* C. M. piloſus, *hairy-ſkinned melon.* C. M. reticulatus, [illegible]. C. M. [illegible], [illegible]. C. M. [illegible]roſus, [illegible] C. M. turbinatus, *top-ſhaped melon.* C. M. virens, *green-rinded melon.*

Cucumis chate, *Egyptian melon.* C. ſativus, *common prickly cucumber.* C. ſativus albus, *white prickly cucumber.* C. S. longus, *long prickly cucumber.* C. flexuoſus, *[illegible] Turkey cucumber.*

Cucurbita lagenaria, *bottle gourd.* C. citrullus, *water melon.* C. pepo, *common pompion.* C. P. oblongus, *long pompion.* C. verrucoſa, *warted gourd.* C. [illegible]

Melothria pendula, *small creeping cucumber.*

Sect. 2. Apples of Trees.

Achras ſapota, *oval-fruited ſapota.*

Averrhoa carambola, *goa apple.* A. bilimbi, *bilimbia.*

Punica granatum, *pomegranate tree.*

Pyrus communis, *pear-tree.* P. malus, *the crab-tree.* P. cydonia, *quince-tree.*

91 Leguminous plants.

VIII. LEGUMINOUS PLANTS.

Sect. 1. Pods and Seeds of Herbaceous Plants.

Arachis hypogæa, *American ground nut.*

Cicer arietinum, *the chick pea.*

Dolichos ſoja, *Eaſt India kidney bean.*

Ervum lens, *lentil.*

Lotus edulis, *incurved podded bird's-foot trefoil.* L. tetragonolobus, *ſquare podded crimſon pea.*

Lupinus albus, *white flowering lupine.*

Phaſeolus vulgaris, *common kidney bean.* P. V. coccineus, *ſcarlet flowering kidney bean.* P. albus, *white-flowering kidney bean.*

Piſum ſativum, *common garden pea.* P. umbellatum, *crown pea.* P. quadratum, *angular ſtalked pea.* P. maritimum, *ſea pea.*

Vicia faba, *common garden bean.*

Sect. 2. Pods and Seeds of Trees.

Caſſia fiſtula, *ſweet caſſia,* or *pudding-pipe tree.*

Ceratonia ſiliqua, *carob,* or *St John's bread.*

Coffea Arabica, *Arabian coffee.* C. occidentalis, *American C.*

Cytiſus cajan, *pigeon pea.*

Epidendrum vanilla, *ſweet-ſcented vanilla.*

Hymenæa courbaril, *baſtard locuſt tree.*

Tamarindus indica, *the tamarind.*

92 Esculent grains and seeds.

IX. ESCULENT GRAINS AND SEEDS.

Triticum æſtivum, *ſummer* or *ſpring wheat.* T. hybernum, *winter* or *common wheat.* T. turgidum, [illegible] *thick-ſpiked wheat.* T. polonicum, *Poland wheat.* T. ſpelta, *German* or *ſpelt wheat.* T. monococcum, *St Peter's corn.*

Avena ſativa, *manured black oat.* A. nuda, *naked oat.*

Hordeum vulgare, *common barley.* H. diſtichon, *long-eared barley.* H. hexaſtichon, *ſquare barley.* H. zeocriton, *battledore* or *ſprat barley.*

Secale cereale. *Common rye.*

Coix lachryma jobi, *Job's tears.*

Cynoſurus cerocanus, *Indian cock's-foot graſs.*

Feſtuca fluitans, *flote feſcue graſs.*

Holcus ſorghum, *Guinea corn,* or *Indian millet.*

Nymphæa nelumbo, *Egyptian bean.*

Oryza ſativa, *rice.*

Panicum miliaceum, *common millet.* P. Italicum, *Italian millet.*

Phalaris canarienſis, *canary graſs,* or *canary ſeed.*

Polygonum fagopyrum, *buck wheat.*

Quercus eſculus, *cut-leaved Italian oak.* Q. phellos, *carolinean willow-leaved oak.*

Seſamum orientale, *eaſtern ſeſamum.* S. Indicum, *Indian ſeſamum.*

Sinapis nigra, *black muſtard.* S. arvenſis, *wild muſtard* or *charlock.*

Zea mays, *Maize,* or *Indian wheat.*

Zezanea aquatica, *water zezania.*

X. ESCULENT NUTS.

93 Esculent nuts.

Amygdalus communis, *ſweet* and *bitter almond.*

Anacardium occidentale, *caſhew nut.*

Avicenna tomentoſa, *eaſtern anacardium,* or *Malacca bean.*

Corylus avellana, *hazel nut.*

Cocos nucifera, *cocoa nut.*

Fagus caſtanea, *common cheſnut.*

Juglans regia, *common walnut.* J. nigra, *black Virginian walnut.*

Jatropha curcas, *Indian phyſic nut.* J. multifida, *French phyſic nut.*

Pinus pinea, *[illegible] or manured pine.*

Piſtacia vera, *piſtachia nut.* P. narbonenſis, *trifoliate-leaved turpentine tree.*

Theobroma cacao, *chocolate nut.*

Trapa natans, *Jeſuit's nut.*

XI. ESCULENT FUNGUSES.

94 Esculent funguſes.

Agaricus campeſtris, *common muſhroom.* A. pratenſis, *the champignion.* A. chantarellus, *chantarelle agaric.* A. delicioſus, *orange agaric.* A. cinnamomeus, *brown muſhroom.* A. violaceus, *violet muſhroom.*

Lycoperdon tuber, *the truffle.*

Phallus eſculentus, *the morel.*

For the botanical arrangement and characters of theſe plants, ſee the article Botany. For a particular account of the individuals as articles of diet, we muſt refer our readers to Bryant's Flora Dietetica, Cullen's Materia Medica, vol. i. the ſynopſis of Materia Alimentaria and Materia Medica, and Sir John Sinclair's Code of Health and Longevity, vol. i. The preparation and uſe of bread have already been treated of at conſiderable length under that article. The uſe and beſt methods of preparing potatoes are given under Agriculture, N° 288, &c.

F. DRINK.

Drink.

Drinks may be divided into common water, vegetable infuſions or decoctions, fermented liquors, animal fluids, and animal infuſions or decoctions. The two laſt have been already ſpoken of, and water will be conſidered hereafter. We ſhall here only make a few obſervations on the ſecond and third heads.

The vegetables employed for infuſions or decoctions uſed as drink, are chiefly tea, coffee, and chocolate.

Tea.

All the various kinds of tea imported into this coun-

try,

we receive under the denominations of bohea and green; generally supposed to be the produce of the same species of plant: though Linnæus has described them as two specifically different, founding the distinction on the number of their petals. Others have observed a difference in the leaves. Still, however, it is uncertain whether they present merely accidental differences, occasioned by diversity of soil, situation, and culture. While the reserved and jealous policy of the Chinese continues, many interesting particulars respecting the natural history of this plant must remain unknown to Europeans.

It had been well for the inhabitants of Great Britain, if the tea-leaf had never found its way to this country; they would not then have been tormented, as thousands of them now are, with an incredible train of nervous symptoms, with stomachic and bowel complaints, with headach, &c. To the abuse of tea-drinking may be aſcribed, in a great meaſure, the increaſed frequency of conſumptions; and many of the diſorders of children, and eſpecially hydrocephalus, tabes meſenterica, rickets, &c. may be traced to the ſame ſource.

The tea-leaf, when freſh from the tree, is evidently poiſonous. It is true that it loſes ſome of its acrimony by drying: but even in the ſtate in which it is ſent to this country, it retains much of its narcotic nature. What ſerious miſchief, then, are they bringing upon themſelves, who, as is the caſe with too many of the lower claſs of ſociety, make it a principal part of their daily ſubſiſtence! The money which ſhould go to purchaſe wholeſome and ſubſtantial food, is ſquandered away in procuring what of itſelf affords no nouriſhment at all; for whatever nouriſhment is derived from the infuſion of tea, is owing to the ſugar and milk which are added to it; and were it not for theſe additions, its deleterious effects would be much ſooner and much more powerfully felt.

The time, it is to be hoped, is not far diſtant, when the poor ſhall be enlightened upon this important point. The next generation will hardly believe that their predeceſſors ſquandered away ſo much money, and took ſuch extraordinary delight in defrauding their bodies of their proper and natural aliment, and in bringing upon themſelves infirmity and diſeaſe. Let the rich and the intemperate indulge, if they chooſe, in the narcotic draught; to their heated and oppreſſed ſtomachs it may not do harm; it may even afford momentary relief. But let the poor abſtain from it. They are not ſurcharged with high-ſeaſoned food. They have no feveriſh thirſt, no feveriſh heat to allay, after their ordinary repaſt. To them it is totally unneceſſary as a help to digeſtion, and as an article of ſuſtenance it is worthleſs and improper. They would, therefore, be better, infinitely better, without it.

Beſides its narcotic quality, there is another property of the tea-leaf which renders its continued uſe injurious to the conſtitution; we mean its aſtringency. Add to theſe the warm water, and we have, in this unnatural beverage [illegible], three different powers conſpiring to [illegible] and the organs of digeſtion, and ultimately the whole ſyſtem. Diet.

If it be aſked, what are they who have been long accuſtomed to tea to ſubſtitute in its place; we anſwer milk, milk porridge, gruel, broth, cocoa, or the like for breakfaſt; and in the afternoon, milk and water, orgeat, or lemonade in the ſummer, and coffee in the winter.

It ſhould be underſtood, that the preceding remarks apply to the general abuſe of tea as an article of ſuſtenance; for its occaſional employment in a dietetical and medicinal way in ſome kinds of ſickneſs, is often of uſe. Thus, the ſimple infuſion, without ſugar or milk, is a good diluent and ſedative in ardent fevers; and as it promotes perſpiration and urine, it is frequently drunk with advantage in colds, catarrhs, rheumatiſm, headach, &c. It is alſo ſerviceable in caſes of ſurfeit and indigeſtion *.

For the uſe and abuſe of coffee, ſee the article COFFEE.

97 Chocolat

Chocolate is more nouriſhing and leſs heating than coffee. It is commonly made too thick, but when of a proper degree of ſtrength, it is a very palatable and wholeſome beverage, though on account of its oily quality it proves oppreſſive and cloying to ſome ſtomachs. See CHOCOLATE.

98 Cocoa.

Cocoa is in fact only a weak chocolate; and being leſs pure than the former, weak chocolate might properly be ſubſtituted for it.

Of fermented liquors we ſhall mention only malt liquors, wine, and ardent ſpirits.

99 Malt liquors.

Well fermented malt liquors, whether from barley or other grain, provided they be not too ſtrong, are wholeſome, refreſhing, and ſtrengthening drinks. As theſe liquors are very nutritious, they are chiefly ſuited to perſons who lead a buſy and active life. With ſedentary and bilious perſons they do not agree ſo well; and they are improper for the corpulent and aſthmatic, and thoſe who are liable to giddineſs or other complaints of the head. They are better when of a middle age, than when kept very long. Beer made from the infuſion of malted groats, or malted rye, is lighter and more diuretic than the common barley beer. Spruce beer is a powerful diuretic and antiſcorbutic; it is, however too cold for ſome conſtitutions. Bottled-beer is, on account of the fixed air which it contains, more refreſhing than the barrelled. It is frequently preſcribed as an antiſeptic and reſtorative in low fevers and convaleſcencies; but care muſt be taken, during the uſe of it, that it do not operate too freely by ſtool. London porter, with the common properties of malt-liquor, poſſeſſes ſuch ſtomachic and diuretic qualities, as give it a preference over common beer and ale, in many caſes. Being ſtrongly impregnated with bitters of a narcotic kind, it is apt to induce drowſineſs, and conſequently is improper wherever there is a tendency to cephalagia, apoplexy, or other affections of the head (A).

A

* Syſt. of Mate.

(A) We cannot pretend to decide whether the prejudices that have for ſome time prevailed againſt the wholeſomeneſs of London porter are well founded or not; but if its compoſition be ſuch as given under the article BREWING, we are decidedly of opinion that it is a liquor quite unfit for conſtant drink.

A temperate uſe of wine is highly conducive to the health. All the functions, both of body and mind, are rouſed and facilitated by it. It has a powerful effect upon the organs of digeſtion, upon the circulation, and upon the nervous ſyſtem, promoting digeſtion, ſtrengthening the action of the heart and arteries, and raiſing the ſpirits. Such is its beneficial operation, when taken ſparingly. In exceſſive quantities it has oppoſite effects, deſtroying the ſtomach, inducing emaciation and debility, and occaſioning inflammation and obſtruction in the liver, lungs, &c. whence gout, palſy, dropſy, conſumptions, diabetes, &c.

In a dietetical view, wines are to be conſidered as they are, either acid or ſweet, ſoft or auſtere. The acid wines, of which the Rheniſh and Hock are the moſt noted, are the leaſt heating, and the moſt diuretic. The ſweet, ſuch as the Frontiniac, Malaga, Tent, Cape, are heating and ſudorific. The ſoft, or acido-dulceſcent wines, ſuch as Champagne, Claret, Burgundy, Madeira, &c. are leſs ſtimulating than the ſweet, and more cordial than the acid wines. Of the auſtere and aſtringent, that which is moſt uſed in this country is the red Port, which, when it has not been mixed with too large a proportion of brandy, is a generous and ſtomachic wine, well ſuited to the generality of Britiſh conſtitutions.

101 ry and der. Perry and cyder hold a middle place between wine and malt liquor. They are leſs nutritious than the latter, and leſs cordial than the former.

102 dent nts. In ſmall quantities ardent ſpirits are a powerful cordial and corroborant, raiſing the pulſe, ſtrengthening the ſtomach, promoting digeſtion, and preventing flatulence. Taken ſparingly, and diluted with water, they ſupply the place of wine, and with ſome conſtitutions agree better, as they are not like wine, diſpoſed to create acidity. The abuſe of them is productive of the ſame pernicious effects as thoſe which ariſe from an exceſſive indulgence in wine, but in a greater degree. French brandy is the moſt bracing and ſtomachic; gin and rum the moſt diuretic and ſudorific. Arrak, which is diſtilled from rice, is more heating than the two laſt. Whiſky is conſidered as a lighter ſpirit than any of the former, from its containing leſs eſſential oil, and it therefore agrees better with moſt ſtomachs. The qualities of all theſe ſeveral ſorts of ſpirits are improved by long keeping *.

On the general ſubject of drinks, ſee the article Drink.

Practi- l Synopſ the Ma- ia Ali- ntaria.

103 ondi- nts.

C. CONDIMENTS.

Condiments are thoſe ſubſtances which are taken with our food, to promote digeſtion, or to correct ſome hurtful property in the food taken. They are uſually divided into ſaline, ſaccharine, aromatic, and oleaginous.

Of the ſaline condiments, the principal are common ſalt and vinegar.

104 alt. Common ſalt, by its ſtimulant action on the throat, gullet, and ſtomach, ſeems to promote the ſecretion of ſaliva and of the gaſtric juice, and thereby facilitates digeſtion. It alſo appears, when taken in ſmall quantity, to increaſe the ſolubility of moſt foods, but when taken too plentifully, it renders the food hard and difficult of ſolution. Salted meats and fiſh are conſequently unwholeſome when made a common article of diet.

105 Vinegar. Vinegar in ſmall quantities is a grateful and ſalutary ſtimulus to the ſtomach, correcting the putreſcency of animal food, and the flatulency of vegetables. It is prejudicial in many inflammatory caſes, eſpecially in calculous and gouty perſons; in conſumption and chloroſis; to rickety patients and young children.

Pickles may be conſidered as merely receptacles for vinegar, except in as far as the vegetables of which they are compoſed are in their nature warm and aromatic, as the onion.

106 Sugar. Sugar is nutritive, antiſeptic and laxative, and is often conſidered as promoting the ſolution of fat in the ſtomach; but as it is very fermentable, it is apt, in many conſtitutions, to produce flatulence, heat, and thirſt. Its unlimited uſe ſeems to be one cauſe of the increaſed and increaſing frequency of bilious and hypochondriacal diſorders. Chlorotic girls, rickety children, hyſterical women, and all who are troubled with acidity in the ſtomach and bowels, ſhould abſtain from it; and thoſe who are anxious to preſerve their teeth white and ſound, ſhould not make free with it. To theſe obſervations, however, there are ſome conſtitutions which furniſh exceptions. Thus we are told, that one of the dukes of Beaufort took, for the ſpace of 40 years, nearly a pound of ſugar every day; yet it neither diſordered any of the viſcera, nor injured the teeth, and he lived to attain the age of 70.

107 Spices. The aromatic condiments conſiſt chiefly of the foreign ſpices, as pepper, Cayenne pepper, cinnamon, nutmeg, cloves, ginger, and of a few garden roots and ſeeds, ſuch as garlick, leek, onion, horſe-radiſh, and muſtard. Of theſe we ſhall take notice under their proper heads in the Materia Medica.

The oleaginous condiments conſiſt merely of olive oil and butter.

108 Oil. Oil when uſed as a ſeaſoning to raw vegetables, checks their fermentation in the ſtomach, and thereby prevents them from proving too flatulent. Uſed in this manner, in ſmall quantities, it proves a help to digeſtion; but when taken in conſiderable quantities, it has an oppoſite effect, and lays the foundation for bilious complaints.

109 Melted butter. The moderate uſe of melted butter with boiled vegetables, is, in general, by no means unwholeſome; but it frequently diſagrees with bilious and hypochondriacal people.

The proper method of preparing food conſtitutes the art of cookery, on which we ſhall preſent our readers with the following general remarks, taken from Sir John Sinclair's Code of Health and Longevity.

110 Cookery. The primeval inhabitants of the earth certainly ate both their vegetable and animal food raw; and to this day ſome of the African nations, the Eſquimaux Indians, the Patagonians and Samocides, devour raw fleſh and fiſh, and drink the blood of the animals. Raw food promotes great bodily vigour, ferocity of mind, and love of liberty.

In general, however, animal food undergoes ſome preparation before it is conſumed. It is hardly to be credited the ſhifts which ſome tribes have been put to, for want of utenſils for cooking; as putting heated ſtones in the bellies of pigs to roaſt them, or burning the ſtraw in order to parch the grain. From theſe humble attempts, the great refinements of cookery, which is properly a branch of chemiſtry, originated.

It is certain that cookery is an uſeful art. By it many articles are rendered wholeſome, which could not otherwiſe have been eaten; but by it, at the ſame time, it muſt be acknowledged, that ſome articles are rendered unwholeſome, which would otherwiſe have produced nouriſhing food.

By cookery, many foods are rendered more palatable and digeſtible, and when prepared in a ſimple manner, more conducive to health.

111 Cookery may be conſidered under two general heads, the ſimple, and the refined or compound.

The firſt, though apparently eaſy, requires a conſiderable degree of attention and experience; and the ſecond is an art of ſo diverſified and extenſive a nature, that it is rarely carried to any conſiderable degree of perfection, and it would have been no loſs to human nature if it had never been invented.

Simple cookery includes the following modes of dreſſing meat: 1. Roaſting. 2. Boiling. 3. Stewing. 4. Broiling. 5. Frying. 6. Baking; and 7. Digeſting.

112 Roaſting. 1. *Roaſting* was certainly the firſt mode invented to prepare animal food; for boiling was a more complicated proceſs, and required the art of manufacturing veſſels that could withſtand the effect of heat. Roaſting, it is well known, requires a greater proportion of heat than boiling, and more ſkill in the preparation. By the application of fire, a conſiderable proportion of watery ſubſtance is exhaled from the meat. In order to be done properly, the roaſting ſhould be conducted in a gradual manner, and the heat moderately, but ſteadily applied, otherwiſe exſiccation rather than roaſting, takes place. Roaſted meat is certainly the beſt means of conſuming the fleſh and taſting the natural juices of the meat. It is alſo peculiarly calculated for birds of every ſort, and for young and tender meat, taking off its viſcidity, and giving it a firmneſs and dryneſs that otherwiſe it would not poſſeſs.

Roaſted meat, at leaſt of the larger kinds, as beef, mutton, and veniſon, is preferred in England, and boiled or baked meat in France. The meat of England has not, perhaps, the ſame flavour as that of France, but it is larger, richer, and fatter, and appears to more advantage in a roaſted ſtate. Beſides, coal fires are better adapted for that proceſs of cookery than wood or peat. It is found, indeed, that meat, roaſted by a fire of peat or turf, is more ſodden than when coal is employed for that purpoſe.

Our meat in England (Cadogan aſſerts) is generally over-done, and particularly over-roaſted. In regard to over-roaſting, the action of fire, if continued too long, has a tendency to change mild animal fleſh into ſomething of another quality; the fat, in particular, becomes bitter and rancid. The leſs, therefore, that all fleſh meat undergoes the power of the fire, the milder and wholeſomer it is. This doctrine, however, is denied by Falconer. He admits, that meat little done is the moſt ſoluble, but at the ſame time contends, that it is exceedingly alkaleſcent, and runs quickly into putrefaction. Hence the French, who live in a warm climate, find it neceſſary not only to eat a great quantity of bread, to prevent the putrefying effects of animal food, but alſo to have their meat thoroughly boiled and roaſted.

113 Boiling. 2. *Boiling* is alſo an excellent mode of preparing animal food, rendering it more ſoluble, without deſtroying, if properly done, its nutritious qualities, and being peculiarly calculated for weak ſtomachs. But however uſeful moderate boiling may be in theſe reſpects, yet, when carried to an exceſs, every thing ſoluble is extracted, the nutritious parts are conveyed to the liquor, and the meat itſelf is left behind inſipid, hard, and unfit for nouriſhment.

Young and viſcid food, as veal, chickens, partridges, &c. are more wholeſome when roaſted than boiled, and eaſier digeſted; but beef and mutton are eaſier digeſted when boiled than roaſted; conſequently boiling ſuch meat is better calculated for weak ſtomachs. Boiling is particularly applicable to vegetables, rendering them more ſoluble in the ſtomach, and depriving them of a conſiderable quantity of air, ſo injurious to weak ſtomachs.

The uſual mode of preparing fiſh for the table is by boiling, roaſting rendering them more indigeſtible.

It is proper to obſerve, that thoſe who are trained to athletic exerciſes, have their meat roaſted or broiled, and not boiled; as it is ſuppoſed, that, when boiled, a great part of the nutritive juices of the meat is loſt in the water.

114 Stewing. 3. *Stewing* is reckoned the mode by which the greateſt quantity of nouriſhment is derived from the meat. By this plan the texture of the meat is rendered more tender, its ſoluble parts are not fully extracted, and it is left in a form peculiarly fluid and nouriſhing, while the ſoup alſo, or fluid, contains a ſufficient proportion of the animal extract.

115 Broiling. 4. *Broiling*, conſiſts in expoſing meat to the near application of a naked fire, by which means its outer ſurface immediately hardens, before the heat has penetrated the whole. This prevents any exceſs of exhalation; and the meat, when done, is rendered ſufficiently tender. It is peculiarly ſuited for ſteaks, which are, comparatively ſpeaking, eaten in a juicy and almoſt in a raw ſtate.

116 Frying. 5. *Frying* is a proceſs that renders meat more indigeſtible than any other, and indeed, might be included under the head of compound cookery. It is performed by cutting meat into thin ſlices, and putting it into a veſſel over the naked fire. As the lower ſurface of the meat would thus be burnt or hardened, ſome fluid matter, generally of an oily nature, is introduced, which acquires, from the heat, a burnt or empyreumatic taſte, and becomes hardly miſcible with the fluids in the ſtomach. It requires, therefore, the addition of ſtimulants to enable the ſtomach to digeſt it.

117 Baking. 6. *Baking* conſiſts in the application of heat in a dry form, but in a veſſel covered with a paſte inſtead of its being expoſed to the open air. Any conſiderable exhalation is thus prevented, and the meat, by the retention of all its juices, is rendered more nouriſhing and tender. But baked meat is not ſo light, or ſo eaſily digeſted, from the greater retention of its oils, which are in a burnt ſtate. It requires, therefore, the additional ſtimulus of ſpices and aromatics, to render it lighter, and to increaſe the power of the ſtomach to digeſt it.

118 Digeſting. 7. *Digeſting* is the laſt diſcovered proceſs of ſimple

cookery. [illegible] preferred [illegible] [illegible] being [illegible] to a very high tempe[illegible] the [illegible] [illegible] are procured. It is not, however, [illegible].

119 [illegible] animal [illegible] which it may [illegible] water, [illegible] or [illegible]. This [illegible] is of a [illegible], and though it contains [illegible] [illegible] than is commonly imagined. Nor are those jellies, which are the mucilaginous extracts of certain parts of animals, as [illegible], very digestible; indeed, a too liberal use of them has often proved injurious. They can only be recommended for the sick, accompanied with a quantity of stale bread. To those who require an article of this sort, more especially if their stomachs are weak, simple beef tea, properly prepared, is the most nutritive balsam that can be administered.

It may also be proper to observe, that even after provisions have been dreſſed in the kitchen, they have often to undergo some operations of cookery at the table; this is principally by the addition of ſome of the various ſorts of ſeaſoning or condiments.

120 One would imagine, that all the various modes of preparing food above enumerated, might ſatisfy the moſt luxurious appetite; but, instead thereof, the ingenuity of man has been exerted to diſcover a number of other preparations. Hence, a ſyſtem of refined or compound cookery has been invented, more flattering to the palate than favourable to the health.

If would be improper to touch upon proceſſes which [illegible] for any writer on dietetics to mention [illegible]. Some diſhes may be [illegible], which may occasionally be taſted, and plain ſauces may be a uſeful addition to fiſh and vegetables; but the generality of ragouts, made diſhes, and the like, are of a poiſonous quality, and cannot be too anxiouſly avoided by thoſe who [illegible] the preſervation of their health *.

The foregoing obſervations on diet are adapted chiefly to perſons in health; but it is of great importance for a medical man to know what is the moſt proper diet for the ſick and for convaleſcents. To treat this ſubject properly would occupy more room than we can allot to it, we ſhall, therefore, only inſert here the following remarks by the late Dr Heberden, with which we ſhall conclude this part of the article.

121 "Many phyſicians appear to be too ſtrict and particular in the rules of diet and regimen, which they deliver as proper to be obſerved by all who are ſolicitous either to preſerve or recover their health. The common experience of mankind will ſufficiently acquaint any one with the ſorts of food which are wholeſome to the generality of men; and his own experience will teach him which of theſe agrees beſt with his particular conſtitution. Scarcely any other directions beſides theſe are wanted, except that, as variety of food at the same meal, and poignant ſauces, [illegible] than they can well digest; they ought [illegible] with any chronical [illegible] from them. But whether meat ſhould be boiled or roaſted, or dreſſed in any other plain way, and what ſort of vegetables ſhould be eaten with it, we never yet met with any perſon of common ſenſe who did not appear fitter to chuſe for himſelf than we could direct him. Small beer, where it agrees, or water alone, are the properest [illegible] meals. Wine [illegible] mixed with water [illegible] [illegible] than ever were hurt by ſmall beer from its firſt invention.

"In fevers a little more restraint is neceſſary, but not ſo much as is often enjoined. The ſtronger ſorts of meat and fish are [illegible] loathed by the sick themſelves, nor could they be eaten without offending the ſtomach, and increaſing the diſtemper, while it is at all conſiderable; but in its decline the ſick are often deſirous of ſome of the milder ſorts of meat, and no harm follows from indulging their desire. The English are said to eat more meat when they are well than most other nations; but were remarkable, so long ago as the time of Eraſmus, for avoiding it more ſcrupulouſly when they are ſick than any other people. How high ſoever the fever be, the ſick may be ſafely nouriſhed with weak broths and jellies, and with any vegetable ſubſtances, if we except the acid and [illegible], or with the infuſions or decoctions prepared from them; and we know no reaſon for prefering any of theſe to the reſt. Eggs and milk have been, we know not by what authority, forbidden in all fevers; but as far as our experience goes, they both afford innocent food in the worſt, where they are grateful to the patients.

"The feveriſh thirſt is [illegible] by [illegible], which may be drunk either warm or cold, at the option of the ſick perſon, and he may drink as much as he pleaſes; but we [illegible] in [illegible] him to gorge himſelf with liquids, as is often done, againſt his inclination and ſtomach. If water be deemed too inſipid, currant jelly, and a variety of ſyrups, may be diſſolved in it; or [illegible], or baum, or toaſted bread, may be infuſed in it; or decoctions may be made of oatmeal, barley, or rice; or the water may be made into an emulſion with the oily ſeeds; all which, with a variety of ſimilar ſubſtances, merely correct its inſipidneſs, but in other reſpects leave it juſt what it was.

"There is ſcarcely any diſtemper, in every ſtage of which it may not be ſafely left to the patient's own choice, if he be perfectly in his ſenſes, whether he will ſit up, or keep his bed. His ſtrength and his eaſe are chiefly to be attended to in ſettling this point; and who can tell ſo well as himſelf, what his eaſe requires, and what his ſtrength will bear?

"[illegible] about the propriety of changing [illegible], but [illegible] about changing the foul air of the ſick chamber by any of the means which could purify and refreſh it. There can be very little reaſon to fear any miſchief from the cold which the ſick may feel while their clean linen is putting on; for their attendants, with common care, will [illegible] neceſſarily be done for them. But ſome have a ſtrange [illegible] in [illegible] after it has been [illegible] not their patients, [illegible]

[illegible] fresh, but ſuch only as has been worn, or lain in, by other perſons. By this contrivance indeed the ſmell of the ſoap might be taken off; but few cleanly people would think they gained any advantage by the change. Now, if a faint ſmell of ſoap were noxious, then ſoap makers and laundry ſervants muſt be remarkably unhealthy, which is contrary to experience; nor is it leſs falſe, that the ſick are injured by the cleanneſs of what they wear; on the contrary, the removing of their foul things has often diffuſed over them a ſenſe of eaſe and comfort, which has ſoon lulled them into a quiet and refreſhing ſleep *."

PART II. OF THE GENERAL ACTION OF REMEDIES, AND THEIR CLASSIFICATION.

WE ſhall not attempt any new or original diſquiſition on the action of remedies, but ſhall merely ſtate the moſt generally received opinions on the ſubject. We ſhall begin with the doctrine of the diſciples of Cullen, which has been well expreſſed by Dr Percival in the following propoſitions.

1. *Medicines may act on the human body by an immediate impreſſion on the nerves of the ſtomach and bowels, either in their proper form, in a ſtate of decompoſition, or after a new arrangement of their parts.*—The ſympathy of the ſtomach with the whole animated ſyſtem is ſo obvious to our daily experience, that it cannot require much illuſtration. After faſting and fatigue, we feel that a moderate quantity of wine inſtantly exhilarates the ſpirits, and gives energy to all the muſcular fibres of the body. It has been known even to produce a ſudden and large augmentation of weight, after much depletion, by rouſing the abſorbent ſyſtem to vigorous action. Such power is peculiar to living machines; and is properly denominated by phyſicians, the *vis medicatrix naturæ*. But apparent as is the ſympathy of the ſtomach, the laws by which it is governed are very inſufficiently underſtood; and we have hitherto learned only from a looſe induction of facts, that the nerves of this delicate organ ſeem to be endowed with diverſified ſenſibilities; that impreſſions made by the ſame or different ſubſtances, have their appropriate influences on different and diſtant parts; and that the ſtomach itſelf undergoes frequent variations in its ſtates of irritability. A few grains of *ſulphate of copper*, taken internally, excite inſtantly the moſt violent contractions of the abdominal, and other muſcles concerned in vomiting. A doſe of *ipecacuanha*, as ſoon as it produces nauſea, abates both the force and velocity of the heart, i[illegible]; and affects the whole ſeries of blood veſſels, from their origin to their minuteſt ramifications, as is evident by the paleneſs of the ſkin under ſuch circumſtances, and by the efficacy of emetics in ſtopping hæmorrhages. The head, when diſordered with vertigo, ſometimes derives ſudden relief from a tea ſpoonful of ether, adminiſtered in a glaſs of water. An inceſſant cough has been known to attack the lungs, in conſequence of the ſtimulus of a pin, which had been unwarily ſwallowed. Of the action of medicines on the ſtomach, after decompoſition or recompoſition, we have an example familiar to every one, in *carbonate of magneſia*. For this earth by neutralizing the acid in the ſtomach, acquires a purgative quality, and at the ſame time [illegible] of great ſalubrity, as an anti[illegible].

2. *Medicines may paſs into the courſe of circulation in [illegible], and being conveyed to different and diſtant parts, may there produce certain appropriate effects.*—Chemiſtry furniſhes us with numberleſs caſes in which ſubſtances undergo changes, and take new forms more remarkable than can be effected by digeſtion, retaining ſtill the *materia prima*, and being capable of reſuming the original arrangement of their particles, and conſequently their original qualities. Now, a body altered in its texture by digeſtion, and carried into the ſyſtem with aliment, may acquire ſpecific powers of acting on particular ſound or diſeaſed parts. Thus, if we ſuppoſe cantharides to be changed in form and texture, when mixed with the chyle, the lymph, or the blood, they may ſtill, in that form and texture, be peculiarly adapted to excite ſtrangury in the urinary paſſages, or, we may conceive that this new modification of their particles may again be altered, and their original compoſition reſtored by a ſubſequent chemical change in the kidneys. The ſenſible qualities of any body are no certain marks of its medicinal action. Peruvian bark does not owe its efficacy in fevers to its bitterneſs, for ſtronger bitters are not poſſeſſed of its febrifuge powers. Antimony, though inſipid, produces a violent action on the nerves of the ſtomach, and yet if applied to the eye, an organ equally ſenſible, it is altogether inert. To what perceptible property in opium are we to aſcribe its narcotic powers? or is there in the ſweet taſte of acetate of lead, any indication of a deadly poiſon? Numberleſs inſtances may be adduced to prove the uncertainty of reaſoning otherwiſe than from obſervation, concerning the action of medicines, and the peculiar ſenſibility of different parts of our ſyſtem to their impreſſion. Following experience, therefore, as our guide, let us notice a few facts that may elucidate the ſubject before us. It is well known that madder root, when taken by an animal, carries its tinging quality to the bones, affecting neither the ſkin, the muſcles, the ligaments, nor the fat. Conſequently this tinging quality is left unchanged by digeſtion; or perhaps it is again recovered, when arrived at the bones, by ſome new arrangement of parts produced by the chemiſtry of nature. Extract of logwood, taken internally, ſometimes gives a bloody hue to the urine. But the aſtringency of it does not ſeem to accompany its colouring matter. We recollect no inſtance wherein the milk either of a nurſe, or of an animal, was tinged with madder or logwood. This affords ſome preſumption, that the pigment does not ſubſiſt in its proper form, in the blood; but that it is recovered by a ſubſequent change in the diſpoſition of its conſtituent particles. And if one ſubſtance ſtain the bones, by being carried into contact with them, another may, in an analogous manner, produce in them fragility or diſſolution.

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erapeutics. folution. In the diſeaſe termed by the French ergot, and which, with ſome probability is aſcribed to the uſe of a ſpecies of unſound corn, the bones loſe the earthy matter that enters into their texture; the gums become ſoft, and are eaſily broken. This effect is gradual, and probably ariſes from ſome unknown quality in the corn, which is either not taken away by digeſtion, or is reſumed in the juices that circulate through the oſſeous veſſels. A change in the proceſs of vegetation may communicate a ſolvent power to an eſculent ſeed. Muſtard acquires this by its natural growth, and is capable of rendering even ivory ſoft and fragile. How far it would produce ſuch an effect on the bones of a living body, if uſed as the chief article of diet, we have no experience on which to ground any ſatisfactory concluſion.

Sulphur, whether externally or internally uſed, produces a cure in the itch. In each way, therefore, we may preſume its operation to be ſimilar. But when taken into the ſtomach, there can be no doubt that it undergoes a change in the modification of its parts, and that it does not circulate through the blood veſſels either in the form or with the properties of ſulphur. Yet when conveyed to the ſurface of the body, it evidently appears to recover its original powers, communicating its peculiar odour to the perſpiration, tinging ſilver, and curing cutaneous defoedations. The ſame holds true of the ſulphuric acid, when adminiſtered in large doſes. It ſeems to loſe oxygen in the animal body, and to paſs off by the pores, as hepatic air, or as volatilized ſulphur. Even when given to nurſes, it proves an effectual remedy for the itch, both in them and the children whom they ſuckle. Mercury combined with ſulphur into the black ſulphuret, has frequently been regarded as inert. Inſtances, however, have occurred in which, under this form, though accurately prepared, it has produced ſalivation; an evident proof, according to Dr Percival, of a chemical change in the ſulphuret, by which the mercury was reſtored to its original powers. That mercury is capable of being reduced to the metallic form, and of collecting in conſiderable quantity in the human body, is proved by the concurrent teſtimony of many authors, who inform us that fluid mercury has been found in the carious bones of venereal patients. A ſalivation is ſometimes produced by antimony. Dr James aſſured Sir George Baker, that he knew ſix inſtances of its being produced by his febrile powder, though he had left mercury out of its compoſition long before they occurred. Indeed, as the patients thus affected had neither their teeth looſened, nor their breath rendered offenſive, there is no reaſon to ſuppoſe that the ſalivation was owing to a mixture of mercury in the powder.

Moſt perſons have experienced the effects of aſparagus on the urine. This takes place very ſpeedily and ſtrongly, though only a ſmall quantity has been eaten. The ſmell is much more diſagreeable than aſparagus itſelf; and as the odorous particles conveyed to the kidneys muſt be greatly diluted in their paſſage, it is probable that a new combination of particles takes place in the urinary organs; and that the odorous part of the ſecretion differs in its form and quality, from what ſubſiſted both in the chyle and in the blood.

There are certain medicines which, when ſwallowed, quickly manifeſt themſelves in the diſcharges, with ſome of their original qualities. A ſtrong ſolution of potaſh, when taken in conſiderable quantities, renders the urine alkaline and lithontriptic, and the ſame excretion becomes impregnated with carbonic acid, if water impregnated with that acid be drunk freely. Dr Percival ſpeaks of a patient to whom ſix grains of balſam of Tolu were given thrice a day, and whoſe urine was ſtrongly ſcented by this ſmall quantity. Garlick affects the breath, though it be applied only about the wriſts; and the milk of a nurſe is eaſily tainted with it. A purgative given to a woman that ſuckles will ſometimes produce no effect on her bowels, but will operate ſtrongly on thoſe of her infant. A ſtill more convincing proof that there may be a renovation of the original qualities of a body, after it has undergone the proceſs of digeſtion, and other ſubſequent changes, is deducible from theſe facts; that butter is often impregnated with the taſte and ſmell of certain vegetables on which the cows have paſtured; that the milk of ſuch cows diſcovers no diſagreeable flavour, any more than the whey or cheeſe prepared from it. Now, butter is formed, firſt by a ſpontaneous ſeparation of cream, and ſecondly, by a fermentation of it; that is, by a twofold and ſucceſſive new arrangement of its elementary parts. By theſe changes, the originally offenſive materials in the food of the cow ſeem to reaſſume their proper form and nature.

After veneſection the ſerum of the blood has ſometimes appeared as white as milk, whilſt the craſſamentum retained its natural colour. This whiteneſs has been ſhewn to ariſe from oleaginous particles floating in the circulating fluids, and may ſerve to explain a fact recorded by a writer of good authority. on the natural hiſtory of Aleppo, that in certain ſeaſons, when oil is plentifully taken, the people become diſpoſed to fevers, and infarctions of the lungs, which ſymptoms were cured by retrenching this indulgence. Some years ago cod-liver oil was annually diſpenſed amongſt the ſick of the Mancheſter hoſpital, to the amount of 50 or 60 gallons. The taſte and ſmell are extremely nauſeous, and it leaves upon the palate a ſavour like that of putrid fiſh. This remedy is more ſalutary when it operates by perſpiration; and the ſweat of thoſe to whom it is adminiſtered, always becomes ſtrongly tainted with it. An oil of the ſame kind forms no inconſiderable part of the food of many northern nations; and it is ſaid to penetrate and imbue the deepeſt receſſes of the body.

Dr Wright relates an experiment to prove that chalybeates do not enter the blood. He forced a dog that had faſted 66 hours, to ſwallow a pound of bread and milk, with which had been mixed an ounce and a half of ſulphate of iron. An hour afterwards he opened the dog, and collected from the thoracic duct about half an ounce of chyle, which aſſumed no change of colour when tincture of galls was dropped into it, though it acquired from the ſame tincture a deep purple, when a quarter of a grain of ſulphate of iron was diſſolved in it. This experiment is uſually deemed deciſive in ſupport of the opinion that chalybeates exert their operation ſolely on the ſtomach, and that the vigour they communicate to the ſyſtem ariſes excluſively from their tonic powers on the alimentary canal, and from the ſympathy of the ſtomach with various other parts of the body. Dr Percival was of opinion, that the tonic action and ſympathy above mentioned, did not preclude the immediate agency of the ſteel on the remote parts of the human frame, as this remedy, in other forms capable of being introduced into the circulation, may exert conſiderable energy as a ſtimulant or aſtringent; and, in his opinion, the experiment adduced proves that the iron did not exiſt in the chyle, in the ſtate of a ſalt capable of ſtriking a black colour with galls. Neither does the oxide of iron, nor the glaſs of iron, poſſeſs this power, yet, though changed, they are both capable of being reſtored to the metallic ſtate. Perhaps with equal reaſon it might be preſumed by one ignorant of chemiſtry, that the ſulphate of iron contains no iron, becauſe it is not acted on by the magnet.

With the foregoing experiments of Dr Wright, Dr Percival contraſts thoſe made by the celebrated Dr Muſgrave, who injected into the jejunum of a dog that had, for a day before, but little meat, about 12 ounces of a ſolution of indigo in fountain water, and, after three hours, opening the dog a ſecond time, he obſerved ſeveral of the lacteals of a bluiſh colour, which, on ſtretching the meſentery, did ſeveral times diſappear, but was moſt eaſily diſcerned when the meſentery lay looſe; an argument that the bluiſh liquor was not properly of the veſſels, but of the liquors contained in it. A few days after this, repeating the experiment in another company, with a ſolution of ſtone blue in fountain water, and on a dog that had been kept faſting 36 hours, he ſaw ſeveral of the lacteals become of a perfect blue colour, within very few minutes after the injection. For they appeared before he could ſew up the gut.

' About the beginning of March following, having kept a ſpaniel faſting 36 hours, and then ſyringing a pint of deep decoction of ſtone blue with common water, into one of the ſmall guts; and after three hours, opening the dog again, he ſaw many of the lacteals of a deep blue colour: ſeveral of them were cut, and afforded a blue liquor, ſome of the decoction running forth on the meſentery. After this he examined the *ductus thoracicus*, and ſaw the receptaculum chyli, and that ductus, of a bluiſh colour; not ſo blue indeed as the lacteals, from the ſolution mixing, in or near the *receptaculum*, with *lympha*, but much bluer than the *ductus* uſed to be, or than the lymphatics under the liver were, with which he compared it.

Stone blue is a preparation of cobalt, potaſh, and white lead, which being converted into glaſs, is ground into fine powder. If ſuch a ſubſtance can pervade the lacteals, we may conclude that they are permeable to other bodies, beſides thoſe deſigned for nutrition, and capable of aſſimilation with the blood. This argument from analogy, receives great additional force from the known fact that mercury, and various other active remedies, may be conveyed into the body through the abſorbents of the ſkin, a ſyſtem of veſſels ſimilar to thoſe above mentioned, in their ſtructure, uſes, and termination. In a caſe of *hydrocephalus internus*, on which Dr Percival was conſulted, a child under one year of age received, by ſucceſſive frictions, 4 ounces 6 drams and 2 ſcruples of ſtrong mercurial ointment between the 8th of February and the 7th of April 1786. One ſcruple was adminiſtered each time; the operation took up more than half an hour, and the part to which the ointment was applied, was always previouſly bathed with warm water; precautions which ſeemed to ſecure the full abſorption of the mercury. The child recovered without any ſymptoms of ſalivation, and continued perfectly well. The doctor repeatedly obſerved, that very large quantities of mercurial ointment may be uſed in infancy and childhood, without affecting the gums, notwithſtanding the prediſpoſition to a flux of ſaliva, at a period of life incident to dentition.

Whence is it that a medicine ſo irritating as mercury, can be conveyed into the courſe of circulation, when even milk, or the mildeſt liquors, if transfuſed into the blood veſſels, have been found to produce convulſions and death? Is it that what paſſes by the lymphatic and lacteals is carried into the thoracic duct, and there mixed with a large portion of the chyle and lymph, by which its acrimony is ſheathed and diluted, or its chemical properties changed, before it enters the maſs of blood? For the abſorbents of the ſkin, and of the inteſtines, ſeem to require a capacity to bear the ſtimulus of theſe extraneous bodies to which, in both ſituations, they are expoſed.

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3. *Medicines introduced into the courſe of circulation may affect the general conſtitution of the fluids; produce changes in their particular qualities; ſuperadd new ones; or counteract the morbific matter with which they may be occaſionally charged.*—By obſervations on the hæmorrhages which have been ſuſtained without deſtruction to life; from experiments made on animals, by drawing forth all their blood; and by a computation of the bulk of the arteries and veins, the maſs of circulating fluids has been eſtimated at 50 pounds in a middle-ſized man, of which 28 pounds are ſuppoſed to be red blood. Fluids bearing ſo large a proportion to the weight of the whole body, have aſſuredly very important offices in the animal economy. Endued with the common properties of other fluids, they are ſubject to *mechanical laws*; being variouſly compounded, they are incident to chemical changes; and, as they are contained in a living vaſcular ſyſtem, their motions become ſubject to the influence of nervous energy *.

126 Murray account the acti of medicines.

The followers of Dr Brown explain the operation of medicines on the principle of their all acting as ſtimulants in a greater or leſs degree. This doctrine, with ſome modification, is thus detailed by Mr Murray. "Medicines, in general, operate by ſtimulating the living fibre, or exciting it to motion. This propoſition has even been ſtated as univerſal, and was received as an axiom, in a ſyſtem ſuperior, perhaps, to any, in conveying juſt and preciſe ideas on the nature of life, and the affections to which it is ſubject. Medicines, in common with all external agents, are, according to this ſyſtem, incapable of directly altering the ſtate of the vital power: they can only excite the parts poſſeſſed of that power to action; and however diverſified their effects may appear to be, ſuch diverſities are to be referred merely to the different degrees of force in which they exert the general ſtimulant power they poſſeſs.

"This propoſition cannot, however, be received in an unlimited ſenſe. From the exhibition of different medicines, very different effects are produced, which cannot be ſatisfactorily explained from the cauſe aſſigned,—the difference in the *degree* of ſtimulant operation. They differ in *kind* ſo far, that even in the greater number of caſes, one remedy cannot by any management of doſe or adminiſtration, be made to produce the effects which reſult from the action of another.

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* See P *cival's* *ſays*, vo

"It is therefore neceſſary to admit of ſome modifications of the general principles above ſtated, and the following are perhaps ſufficient to afford grounds for explaining the operation of remedies, and for eſtabliſhing a claſſification of them ſufficiently juſt and comprehenſive.

"1. Stimulants are not to be regarded as differing merely in the degree of the ſtimulant operation which they exert. An important diſtinction exiſts between them, as they are more or leſs diffuſible and permanent in their action. A ſtimulus is termed diffuſible, which, whenever it is applied, or at leaſt in a very ſhort time after, extends its action over the whole ſyſtem, and quickly produces its full exciting effect. A diffuſible ſtimulus is generally alſo tranſient in its action; in other words, the effect, though ſoon produced, quickly ceaſes. There are others, on the contrary, which, though equally powerful ſtimulants, are ſlow and permanent. Theſe varieties, which are ſufficiently eſtabliſhed, ſerve to explain the differences in the power of a number of the moſt important medicines; and they lay the foundation for the diſtinction of two great claſſes, narcotics and tonics, with their ſubordinate diviſions of antiſpaſmodics and aſtringents, both conſiſting of powerful ſtimulants; the one diffuſible and tranſient, the other ſlow and permanent in their operations.

"There is a difference between ſtimulants, in their actions being directed to particular parts. Some, when received into the ſtomach, quickly act upon the general ſyſtem: others have their action confined to the ſtomach itſelf, or at leaſt, any farther ſtimulant effect they may occaſion is ſlow and inconſiderable; while a third claſs conſiſts of thoſe which operate on one part, often without producing any ſenſible effect on the ſtomach or general ſyſtem. Some thus act on the inteſtinal canal, others on the kidneys, bladder, veſſels of the ſkin, and other parts; the affection they excite in theſe, being the conſequence, not of any ſtimulant operation equally extended over every part, but of one more particularly determined. This difference in the action of ſtimuli is the principal foundation of the diſtinctions of medicines into particular claſſes. Cathartics, for inſtance, are thoſe medicines which, as ſtimuli, act peculiarly on the inteſtinal canal; diuretics, thoſe which act on the ſecreting veſſels of the kidneys; emmenagogues, thoſe which act on the uterine ſyſtem; diaphoretics, thoſe which exert a ſtimulant action on the veſſels of the ſkin. With theſe operations, medicines, at the ſame time, act more or leſs as general ſtimulants, by which each individual belonging to any claſs is thus rendered capable of producing peculiar effects; and many of them, by a peculiarity of conſtitution in the patient, or from the mode in which they are adminiſtered, frequently act on more than one part of the ſyſtem, by which their effects are ſtill farther diverſified. Medicines, when thus determined to particular parts, are ſometimes conveyed to thoſe parts in the courſe of the circulation; more generally their action is extended from the ſtomach, or part to which they are applied, by the medium of the nervous ſyſtem *."

Whatever medical ſyſtem we may adopt, it is obvious that medicines can act on the human ſyſtem only in two general modes; either as it is compoſed of inert matter, or as it forms a living organiſed ſyſtem. In the firſt mode, medicines may act either mechanically or chemically; in the ſecond, they act entirely through the medium of the vital principle.

127 Arrangement of remedies.

The order in which the ſeveral ſubjects of the materia medica have been conſidered, is very different in different writers; and which is the moſt proper, has been diſputed about, while many are of opinion that it is of little conſequence which of them is followed. It has been generally thought proper to follow a plan, in which the ſubjects are, according to a certain affinity, brought together, ſo that a number of them might be, for the purpoſe of medicines, conſidered under the ſame view. Thus, Dr Boerhaave conſidered them in the order of the botanical ſyſtem he had formed, and Linnæus in the order of his own ſyſtem, in which he is followed by Bergius.

128 Botanical arrangement.

It has been thought proper to follow the botanical affinities, in ſo far only as they can be thrown into natural orders; and this, therefore, has been attempted by the learned Profeſſor Murray of Gottingen: but from the imperfection of the botanical affinities in pointing out a ſimilarity of medicinal virtues, this plan will not always unite ſubjects in the latter point of view; and when we conſider that there are yet many plants which do not enter into any natural order, theſe muſt be diſpoſed of in an arbitrary manner, and probably in an unconnected ſtate. It muſt be owned, however, that though the ſcheme of botanical affinities does not entirely anſwer the purpoſe, yet it will ſtill go a certain length, and ought not to be neglected in the ſubdiviſion of any general plan that may be aſſumed.

129 Arrangement according to ſenſible qualities.

It has been ſuppoſed by ſome to be a more eligible plan to unite the ſeveral ſubſtances, as they happen to be related by their ſenſible qualities; this method Cartheuſer and Gleditſch have attempted. This certainly may have its uſe; but from what is ſaid above reſpecting the imperfection of this ſcheme for inveſtigating virtues, it will appear that it will not always unite ſubjects that ought to be united under the ſame view; and it will be found, that in the authors mentioned, who have executed it in the beſt manner poſſible, the deſired effect is by no means produced.

130 Alphabetical arrangement.

From the difficulty of rendering any of thoſe plans tolerably exact and perfect, ſome writers have deſerted all of them, and thought it beſt to throw the ſeveral articles into an alphabetical order, as Newmann and Lewis have done. If, however, there can be any advantage from bringing ſubjects of ſome affinity together, this alphabetical order is the moſt unfit for the purpoſe, as by ſeparating ſimilar ſubſtances, it muſt be perpetually diſtracting to the ſtudent. It can therefore have no advantage but that of a dictionary, in referring readily to any particular ſubject that may be enquired after; but this advantage can be obtained in every plan by means of an index, which cannot be ſaved even in an alphabetical work, as the different names under which the ſame ſubſtances are known neceſſarily requires an index comprehending all thoſe different names.

Similar to thoſe of the alphabetical order, are thoſe plans which, after arranging the ſeveral articles of the materia medica according to the part of the plant employed, as roots, leaves, &c. have thrown theſe again into an alphabetical order, as Alſton and Vogel have done.

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* ...ements ...Materia ...and ...vol. i. ...5.

dance; but it is obvious that this claſſification has no connexion between the ſubjects that follow one another, and can have no advantage over the alphabetical order. Further, by ſeparating the conſideration of the ſeveral parts of vegetables, it will both ſeparate ſubjects that ought to be conſidered together, and will occaſion unneceſſary repetition.

131 [illegible]

Dr Cullen was of opinion that, as the ſtudy of the materia medica is truly the ſtudy of the medicinal virtues, ſo the plan that arranges the ſeveral ſubſtances according to their agreeing in ſome general virtues, will be the beſt adapted to acquiring the knowledge of theſe, and will moſt readily inform the practitioner what different means he can employ for his general purpoſe. It wil alſo inform him how far the ſeveral ſimilar ſubſtances may differ in their degree of power, or how far, from the particular qualities aſſigned to each, he may be directed or limited in his choice.

As it ſeems proper that every practitioner ought, as far as poſſible, to practiſe upon general indications; ſo it is evident that his ſtudy of the materia medica is eſpecially to know the ſeveral means that can anſwer theſe. Such a plan, therefore, muſt be the moſt proper for giving a ſtudent inſtruction; and if, while medicines are arranged according as they anſwer general indications, the particulars be likewiſe thrown together as far as poſſible according to their ſenſible qualities and botanical affinities, this plan will have the advantage of any other that has been propoſed for preſenting together the ſubjects that ought to be conſidered at one and the ſame time, and give the beſt means of recollecting every thing that relates to them.

132 Cullen's arrangement.

Dr Cullen's plan of arrangement is as follows.

He firſt divides all the ſubſtances contained in the materia medica into two general heads, the firſt compriſing alimentary ſubſtances, or meats, drinks, and condiments; the ſecond compriſing medicines properly ſo called. Theſe latter he conſiders as they act on the ſolids or the fluids. Thoſe which act on the ſolids he diſtinguiſhes into ſuch as act on the ſimple ſolids, under which he ranks aſtringents, tonics, emollients, and eſcharotics; and thoſe which act on the living ſolids, under which he claſſes ſtimulants, ſedatives, including narcotics, refrigerants, and antiſpaſmodics. Of thoſe medicines which act on the fluids, he conceives that ſome operate by producing a change on their fluidity, as attenuants and inſpiſſants; or, on the mixture of their component parts, by correcting acrimony, either in general, as demulcents, or in particular as antacids, antalkalines, and antiſeptics. Others he ſuppoſes to act by producing an evacuation of ſuperabundant fluids; and under this head he includes errhines, ſialagogues, expectorants, emetics, cathartics, diuretics, diaphoretics, and emmenagogues.

In his general claſſification, Dr Cullen has been followed by ſeveral writers on the materia medica and therapeutics. Some of the titles of his claſſes have indeed become obſolete, and his order has been almoſt totally changed by ſucceeding writers.

Of thoſe who have copied Dr Cullen's arrangement with ſome modification, there is perhaps none that deſerves more attention than the anonymous author of the "Theſaurus Medicaminum," and a "Practical ſynopſis of the materia alimentaria and materia medica." This author arranges the articles of the materia medica into 12 claſſes: 1. Evacuants, compriſing errhines, ſialagogues, expectorants, emetics, cathartics, diuretics, diaphoretics, emmenagogues; 2. Emollients, compriſing diluents and demulcents; 3. Abſorbents; 4. Refrigerants; 5. Antiſeptics; 6. Aſtringents; 7. Tonics; 8. Stimulants; 9. Antiſpaſmodics; 10. Narcotics; 11. Anthelmintics; and 12. Heteroclites; this laſt being formed to include thoſe articles that could not properly be reduced under the former heads.

Therap tics

133 Arrange ment of [illegible] nopsis.

On this claſſification we may remark, that the general term of evacuants might have been omitted, and its ſubdiviſions might have properly been made diſtinct claſſes, as the articles they contain frequently act a more important part, than merely producing an evacuation of fluids. The claſs of *abſorbents* includes thoſe which Cullen calls antacids, and perhaps this latter term is to be preferred, as it is more explicit and better underſtood. The claſs *antiſeptics* might alſo have been omitted, and the ſubſtances it contains might more properly have been arranged under other heads.

134 Mr Mu ray's ar rangeme

Mr Murray's arrangement, which is very ingenious, is founded principally on the doctrine of univerſal ſtimulus, and he thus explains the principles on which it is eſtabliſhed.

"Thoſe ſtimulants, which exert a general action on the ſyſtem, may firſt be conſidered. Of theſe there are two well-marked ſubdiviſions, the diffuſible and the permanent; the former correſponding to the uſual claſſes of narcotics and antiſpaſmodics; the latter, including likewiſe two claſſes, tonics and aſtringents. In theſe there is a gradual tranſition paſſing into the one from the other, from the moſt diffuſible and leaſt durable ſtimulus, to the moſt ſlow and permanent in its action.

"The next general diviſion is that compriſing local ſtimulants; ſuch are the claſſes of emetics, cathartics, expectorants, ſialagogues, errhines, and epiſpaſtics. Theſe all occaſion evacuation of one kind or other, and their effects are in general to be aſcribed, not to any operation exerted on the whole ſyſtem, but to changes of action induced in particular parts.

"After theſe, thoſe few medicines may be conſidered whoſe action is merely mechanical or chemical. To the former belong diluents, demulcents, and emollients. Anthelmintics may perhaps be referred with propriety to the ſame diviſion. To the latter, or thoſe which act chemically, belong antacids or abſorbents, lithontriptics, eſcharotics, and perhaps refrigerants.

"Under theſe claſſes may be comprehended all thoſe ſubſtances capable of producing ſalutary changes in the human ſyſtem. Several claſſes are indeed excluded which have ſometimes been admitted; but theſe have been rejected, either as not being ſufficiently preciſe or comprehenſive, or as being eſtabliſhed only on erroneous theory.

"The ſubdiviſions of theſe claſſes may ſometimes be eſtabliſhed on the natural affinities exiſting among the ſubſtances arranged under each; on their chemical compoſition; their reſemblance in ſenſible qualities; or, laſtly, on diſtinctions in their medicinal virtues, more minute than thoſe which form the characters of the claſs. In different claſſes one of theſe methods will frequently be found preferable to any of the others."

Mr

rapeu- Mr Murray's arrangement will beſt be underſtood from.

A. GENERAL STIMULANTS.		
	a. Diffuſible.	Narcotics. Antiſpaſmodics.
	b. Permanent.	Tonics. Aſtringents.
B. LOCAL STIMULANTS.		Emetics. Cathartics. Emmenagogues. Diuretics. Diaphoretics. Expectorants. Sialagogues. Errhines. Epiſpaſtics.
C. CHEMICAL REMEDIES.		Refrigerants. Antacids. Lithontriptics. Eſcharotics.
D. MECHANICAL REMEDIES.		Anthelmintics. Demulcents. Diluents. Emollients.*

Murray's ements.

135 arwin's range- ent, It would be improper here to omit the claſſification of the ingenious Dr Darwin, which was publiſhed in his *Zoonomia.* He diſtributes the articles of the materia medica under ſeven heads, according to his opinion of their mode of operation. They are as follows.

1. *Nutrientia*, or thoſe things which preſerve in their natural ſtate the due exertions of all the irritative motions.

2. *Incitantia*, or thoſe things which increaſe the exertions of all the irritative motions.

3. *Secernentia*, or thoſe things which increaſe the irritative motions which conſtitute ſecretion.

4. *Sorbentia*, or thoſe things which increaſe the irritative motions which conſtitute abſorption.

5. *Invertentia*, or thoſe things which invert the natural order of the ſucceſſive irritative motions.

6. *Revertentia*, or thoſe things which reſtore the natural order of the inverted irritative motions.

7. *Torpentia*, thoſe things which diminiſh the exertions of all the irritative motions.

136 utrientia. The *nutrientia* he thus enumerates according to what he conceives to be their degree of nouriſhing power.

I. 1. Veniſon, beef, mutton, hare, gooſe, duck, woodcock, ſnipe, moor-game.

2. Oyſters, lobſters, crabs, ſhrimps, muſhrooms, eel, tench, barbolt, ſmelt, turbot, ſole, turtle.

3. Lamb, veal, ſucking-pig.

4. Turkey, partridge, pheaſant, fowl, eggs.

5. Pike, perch, gudgeon, trout, grayling.

II. Milk, cream, butter, butter-milk, whey, cheeſe.

III. Wheat, barley, oats, peaſe, potatoes, turnips, carrots, cabbage, aſparagus, artichoke, ſpinach, beet, apple, pear, plum, apricot, nectarine, peach, ſtrawberry, grape, orange, melon, cucumber, dried figs, raiſins, ſugar, honey. With a great variety of other roots, ſeeds, leaves, and fruits.

IV. Water, river-water, ſpring-water, calcareous earth. Therapeutics.

V. Air, oxygen, azote, carbonic acid gas.

VI. Nutritive baths and clyſters, transfuſion of blood.

VII. Condiments.

Under *incitantia* (or ſtimulants) he ranks the following articles.

137 Incitantia.

I. Papaver ſomniferum, poppy, opium.

Alcohol, wine, beer, cyder.

Prunus lauro-ceraſus, *laurel;* diſtilled water from the leaves.

Prunus ceraſus, *black cherry;* diſtilled water from the kernels.

Nicotiana tabacum, *tobacco?* the eſſential oil, decoction of the leaf.

Atropa belladonna, *deadly nightſhade;* the berries.

Datura ſtramonium, *thorn apple;* the fruit boiled in milk.

Hyoſcyamus reticulatus, *henbane;* the ſeeds and leaves.

Cynogloſſum, *hounds-tongue.*

Meniſpermum, cocculus, *Indian berry.*

Amygdalus amarus, *bitter almond.*

Cicuta, *hemlock.* Conium maculatum?

Strychnos nux vomica?

Delphinum ſtaphiſagria?

II. Externally, heat, electricity.

III. Ether, eſſential oils.

IV. Oxygen gas.

V. Paſſions of love, joy, anger.

VI. Labour, play, agitation, friction.

138 Secernentia. The *ſecernentia* he diſtinguiſhes into diaphoretics, ſialagogues, mild diuretics, mild cathartics, mild errhines, which, as they will be enumerated preſently, it is unneceſſary to mention here; and beſides theſe, he enumerates the following circumſtances acting on the other ſecretions.

Secretion of mucus of the rectum is increaſed by cantharides, by ſpirit of turpentine.

Secretion of ſubcutaneous mucus is increaſed by bliſters of cantharides, by application of a thin ſlice of the freſh root of white briony, by ſinapiſms, by root of horſe-radiſh, cochlearia armoracia, *volatile alkali.*

Secretion of tears is increaſed by vapour of ſliced onion, of volatile alkali. By pity, or ideas of hopeleſs diſtreſs.

Secretion of ſenſorial power in the brain is probably increaſed by opium, by wine, and perhaps by oxygen gas added to the common air in reſpiration.

139 Sorbentia. The *ſorbentia* he divides into thoſe which affect the ſkin, as ſulphuric or muriatic acids, various acid fruits, and opium; and the oxides of lead, zinc, and mercury, applied externally.

II. Such as affect the mucous membranes, as the juice of ſloes and crab-apples, cinchona, and opium, internally; and externally the ſulphate of copper.

III. 1. Such as affect the cellular membrane, as Peruvian bark; wormſeed, *artemiſia maritima, artemiſia* [illegible]; wormwood, *artemiſia abſinthium;* chamomile, *anthemis nobilis;* tanſey, *tanacetum;* bogbean, *menyanthes trifoliata;* centaury, *gentiana centaurium;* gen-

tian

gentian, *gentiana lutea*; artichoke leaves, *cynara ſcolymus*; hop, *humulus lupulus*.

2. Orange peel, cinnamon, nutmegs, mace.

3. Vomits, ſquill, digitalis, tobacco.

4. Bath of warm air, or ſteam.

IV. Such as affect the veins, as water-creſs, *ſiſymbrium naſturtium aquaticum*; muſtard, *ſinapis*; ſcurvy-graſs, *cochlearia hortenſis*; horſe-radiſh, *cochlearia armoracia*; cuckoo flower, *cardamine*; dog's-graſs; dandelion, *leontodon taraxacon*; cellery, *apium*; cabbage, *braſſica*. Chalybeates, bitters, opium, after ſufficient evacuation; and externally vinegar, friction and electricity.

V. Such as affect the inteſtines, including ſeveral aſtringents, and of the antacid earths.

VI. Such as affect the liver, ſtomach, and other viſcera, as oxide of iron, filings of iron, ſulphate of iron, ſulphate of copper, ſulphate of zinc, calomel, tartrate of antimony and potaſh, acetate of lead, and white arſenic.

VII. Such as affect venereal ulcers, including various preparations of mercury.

VIII. Such as affect the whole ſyſtem, as evacuations by veneſection and cathartics, followed by the exhibition of opium.

IX. External *ſorbentia*, as ſolutions of mercury, zinc, lead, copper, iron, arſenic, or metallic oxides applied in dry powder. Bitter vegetables in decoctions and in dry powders, applied externally; as Peruvian bark, oak bark, leaves of wormwood, of tanſey, chamomile flowers or leaves. Electric ſparks or ſhocks.

X. Bandage ſpread with *emplaſtrum è minio*, or with carpenter's glue mixed with one-twentieth part of honey.

XI. Portland's powder, and the uſe of hops in beer, both of which, when continued, are pernicious.

140 Invertentia. Under the claſs of *invertentia* Dr Darwin ranks the ordinary emetics, violent cathartics, violent errhines and ſialagogues; violent diuretics, and cold ſudorifics, ſuch as poiſons, fear, and approaching death.

141 Revertentia. His catalogue of *revertentia*, is as follows.

Inverted motions which attend the hyſteric diſeaſe, are reclaimed, 1. By muſk, caſtor. 2. By aſafœtida, galbanum, ſagapenum, ammoniacum, valerian. 3. Eſſential oils of cinnamon, nutmeg, cloves, infuſion of pennyroyal, *mentha pulegium*, peppermint, *mentha piperita*, ether, camphor. 4. Spirit of hartſhorn, *oleum animale*, ſponge burnt to charcoal, black ſnuffs of candles, which conſiſt principally of animal charcoal, wood-ſoot, oil of amber. 5. The *incitantia*, as opium, alcohol, vinegar. 6. Externally the ſmoke of burnt feathers, oil of amber, volatile ſalt applied to the noſtrils, bliſters, ſinapiſms.

II. Inverted motions of the ſtomach are reclaimed by opium, alcohol, bliſters, crude mercury, ſinapiſm, camphor and opium externally, clyſters with aſafœtida.

III. Inverted motions of the inteſtinal lymphatics are reclaimed by mucilaginous diluents, and by inteſtinal *ſorbentia*, as rhubarb, logwood, calcined hartſhorn, Armenian bole; and, laſtly, by *incitantia*, as opium.

IV. Inverted motions of the urinary lymphatics are reclaimed by cantharides, turpentine, reſin, the ſorbentia, and opium, with calcareous earth, and earth of alum, by oil externally, warm bath.

V. Inverted motions of the inteſtinal canal are reclaimed by calomel, aloe, crude mercury, bliſters, warm bath, clyſters with aſafœtida, clyſters of ice water, or of ſpring water further cooled by ſalt diſſolved in water contained in an exterior veſſel? Where there exiſts an introſuſception of the bowel in children, could the patient be held up for a time with his head downwards, and crude mercury be injected as a clyſter to the quantity of two or three pounds?

142 Torpentia. The *torpentia* he divides into 13 general heads. 1. Veneſection and arteriotomy; 2. Cold water, cold air, and the reſpiration of air with a diminiſhed proportion of oxygen; 3. Vegetable mucilages; 4. Vegetable acids; 5. Animal mucus, hartſhorn jelly, veal and chicken broth, and perhaps oil, fat and cream? 6. Mineral acids; 7. Silence and darkneſs; 8. Invertentia in ſmall doſes, as nitre, emetic tartar, and ipecacuanha, given ſo as to induce nauſea; 9. Antacids, as ſoap, alkalies, and earths; 10. Medicines preventive of fermentation, as ſulphuric acid; 11. Anthelmintics; 12. Lithontriptics; and, 13. Various external remedies, as the warm bath, poultices, oil, fat, wax, plaſters, oiled ſilk, and carbonic acid gas on cancers and other ulcers.

We were for ſome time at a loſs what arrangement we ſhould follow in the preſent article. It was evidently neceſſary to adopt one that ſhould, as much as poſſible, prevent repetition; and it therefore appeared improper to treat particularly of the articles of the materia medica under the uſual claſſes. The alphabetical order would prevent repetition; but it ſeemed little adapted to the plan of a ſyſtematic treatiſe. On the whole, we have judged it beſt to arrange the individual articles in two methods; 1ſt, Into claſſes according to their ſuppoſed operation on the ſyſtem; and in this view conſider their general uſes; and, 2dly, To treat of them more particularly under an arrangement ſimilar to that of Linnæus. In the remainder of this part of the article, we ſhall therefore conſider the general action and uſe of the various claſſes of remedies, adopting, with the excluſion of *emmenagogues*, the arrangement followed in Dr Kirby's Tables of the Materia Medica; and in a ſucceeding part we ſhall conſider the individual articles under the four heads of animal, vegetable, mineral, and gaſeous ſubſtances.

CLASS I. EMETICS.

143 Definition of emetics. Emetics are ſuch medicines as are calculated to excite vomiting, and thus diſcharge the contents of the ſtomach.

144 Table of emetics. *TABLE of EMETICS.*

I. ANIMAL PRODUCTS.

Murias ammoniæ, *muriate of ammonia*.

Aqua carbonatis ammoniæ, *water of carbonate of ammonia*.

II. VEGETABLE PRODUCTS.

Anthemis nobilis, *chamomile flowers*.
Aſarum europeum, *aſarabacca*.
Centaurea benedicta, *holy thiſtle*.

Cephaëlis ipecacuanha, *ipecacuanha*.
  Vinum ipecacuanhæ, *ipecacuanha wine*.
Nicotiana tabacum, **tobacco in clyſters**.
Olea europæa, *olive oil*.
Scilla maritima, *ſquill*.
  Acetum ſcillæ maritimæ, *vinegar of ſquills*.
Sinapis alba, *muſtard*.

III. Mineral Products.

Sulphas cupri, *ſulphate of copper*.
Sulphuretum antimonii, *ſulphuret of antimony*.
  Oxidum antimonii cum ſulphure vitrificatum, *vitrified oxide of antimony with ſulphur*.
  Vinum antimonii, ***antimonial wine*, L.**
  Tartris antimonii, ***tartrite of antimony***.
  Vinum tartritis antimonii, *wine of tartariſed antimony*.
Sulphas zinci, *ſulphate of zinc*.

145 Effects and uſes of emetics.

The general effects produced by emetics are, a ſenſation of uneaſineſs in the ſtomach, followed by ſickneſs, retching and vomiting. During the nauſea, the pulſe is feeble, quick, and ſometimes irregular, and the countenance is pale; but when the vomiting comes on, the pulſe grows quicker, and the face fluſhed. After the vomiting has ceaſed, the ſickneſs or nauſea commonly goes off entirely, though it ſometimes remains in a diſtreſſing degree. The patient feels languid, heavy, and diſpoſed to ſleep. The ſkin uſually feels moiſt, and the pulſe continues weak for ſome time, but gradually grows fuller and ſlower.

To conſider emetics merely as evacuants of the ſtomach, would be to take a very contracted and imperfect view of their effects; for if traced through the whole of their operation in the various diſeaſes in which they are employed, their influence over the human body appears ſo manifold and extenſive, that they may be juſtly reckoned amongſt the moſt powerful inſtruments which the Materia Medica affords. Hence, beſides their uſe as cleanſers of the alimentary canal, they ſerve to induce ſweating in fevers; to favour expectoration in diſorders of the lungs; to promote abſorption in caſes of dropſy; and to remove certain obſtructed conditions of the viſcera, ſuch as jaundice and ſuppreſſion of the menſes; alſo in caſes of glandular and lymphatic obſtructions, and in ſome caſes of pulmonary conſumption. By means of their peculiar action on the nervous and vaſcular ſyſtem, they allay the ſpaſms in aſthma, and check the diſcharge of blood in hæmorrhages from the lungs and uterus. In the firſt of theſe, viz. in ſpitting of blood, they have been given with advantage by Dr Robinſon, and ſtill more lately by Dr Stoll of Vienna; who ſays, that in ſuch caſes ipecacuanha ſometimes acts like a charm, ſeeming to cloſe the open veſſels of the lungs ſooner and more effectually than any other remedy. In the other, viz. in uterine hemorrhagy, ſmall doſes only of theſe medicines, ſo as to excite ſickneſs, but not vomiting, are found to anſwer beſt. But in both theſe inſtances they ſhould be adminiſtered with caution, ſince it ſometimes happens that they do more harm than good. Dr Cullen once met with an accident of this kind, in which the vomiting increaſed the hemorrhagy to a great and dangerous degree.

Dyſentery is to be added to the number of diſeaſes in which emetics have a peculiarly beneficial effect.

When there is much viſceral inflammation; where there are ſymptoms of great accumulation in the veſſels of the head; in the advanced ſtages of pregnancy, and in caſes of inteſtinal hernia, medicines of this claſs are to be avoided. And, in general, perſons who have weak and delicate ſtomachs ſhould be cautious of employing them too freely, ſince, as Dr Cullen has remarked, frequent vomiting renders the ſtomach leſs fit to retain what is thrown into it, and even weakens its powers of digeſtion.*

Class II. EXPECTORANTS.

146 [illegible] expectorants.

Thoſe medicines are called expectorants, that are employed to promote the excretion of pus or mucus from the windpipe and lungs. In general they are emetics given in ſmaller doſes, though there are ſeveral medicines, eſpecially ſome of the gum reſins, that are conſidered to act in this way, without any tendency to excite vomiting.

147 Liſt of expectorants.

The following articles are uſually employed in this country as expectorants.

I. Vegetable Products.

Cephaëlis ipecacuanha, *ipecacuanha*.
Nicotiana tabacum, *tobacco*.
Scilla maritima, *ſquill*.
  Acetum ſcillæ maritimæ, *vinegar of ſquill*.
  Syrupus ſcillæ maritimæ, *ſyrup of ſquills*.
  Oxymel ſcillæ, *oxymel of ſquill*.
  Tinctura ſcillæ, *tincture of ſquill*.
  Pilulæ ſcilliticæ, *ſquill pills*.
Conſerva ſcillæ, *conſerve of ſquill*.
Allium ſativum, *garlic*.
  Syrupus allii, *ſyrup of garlic*.
Ammoniacum, *gum ammoniac*.
  Lac ammoniaci, *milk of ammoniac*.
Arum maculatum, *wake-robin*.
  Conſerva ari, *conſerve of arum*.
Colchicum autumnale, *meadow ſaffron*.
  Syrupus colchici autumnalis, *ſyrup of colchicum*.
  Oxymel colchici, *oxymel of colchicum*.
Ferula aſafœtida, *aſafœtida*.
  Lac aſafœtidæ, *milk of aſafœtida*.
Hyſſopus officinalis, *hyſſop*.
Marrubium vulgare, *horehound*.
Myrrha, *myrrh*.
Pimpinella aniſum, *aniſeſeed*.
  Oleum volatile pimpinellæ aniſi, *oil of aniſeſeed*.
Polygala ſenega, *ſeneka root*.
  Decoctum polygalæ ſenegæ, *decoction of ſeneka*.
Styrax benzoin, *benjamin*.
  Acidum benzoicum, *benzoic acid*.
  Tinctura benzoes compoſita, *compound tincture of benjamin*.
Alcohol, *ſpirit of wine*.
  Æther ſulphuricus, *ſulphuric æther*.

II. Mineral Products.

Sulphuretum antimonii, *ſulphuret of antimony*.

* [illegible] *caminum*, [illegible]

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Tartris antimonii, *tartrite of antimony.*

Vinum tartritis antimonii, *wine of tartrite of antimony.*

Sulphuretum antimonii precipitatum, *precipitated ſulphuret of antimony.*

Sulphur ſublimatum, *flowers of ſulphur.*

Sulphur ſublimatum lotum, *waſhed flowers of ſulphur.*

Oleum ſulphuratum, *ſulphurated oil.*

Petroleum ſulphuratum, *ſulphurated petroleum.*

Trochiſci ſulphuris, *ſulphur lozenges.*

III. Gaseous Products.

Gas hydrogenium, *hydrogen gas.*

Gas hydrogenium carbonatum, *carbonated hydrogen gas.*

Vaporis aquæ calidæ inhalatio, *inhaling the ſteams of warm water.*

148 Mode of operation of expectorants. The mode in which expectorants promote the excretion of pus or mucus from the lungs, does not appear to be well underſtood. Some ſuppoſe that thoſe which are properly emetic, operate by the ſympathy that exiſts between the ſtomach and lungs, and that the reſt operate by ſome ſpecific action. Mr Murray ſuppoſes that there are various modes of operation by which certain remedies will appear to promote expectoration, and which will give them a claim to the title of expectorants.

Thus, in certain diſeaſes the exhalant veſſels in the the lungs ſeem to be in that ſtate, by which the exhalation of fluid is leſſened, or nearly ſtopped, and in ſuch caſes expectoration muſt be diminiſhed. Any medicine capable of removing that conſtricted ſtate, will appear to promote expectoration, and will at leaſt relieve ſome of the ſymptoms of the diſeaſe. It is apparently by ſuch a mode of operation, that antimony, ipecacuanha, ſquill, and ſome others, promote expectoration in pneumonia, catarrh, and aſthma, the principal diſeaſes in which expectorants are employed.

There is a caſe of an oppoſite kind, that in which there is a redundance of mucus in the lungs, as occurs in humoral aſthma, and *catarrhus ſenilis*. In theſe affections, certain expectorants are ſuppoſed to prove uſeful. If they do ſo, it is probably by being determined more particularly in their action to the pulmonary veſſels, and by their moderate ſtimulus diminiſhing the ſecretion, or increaſing the abſorption, thus leſſening the quantity of fluid, and thereby rendering the expectoration of the remainder more eaſy. The determination of theſe ſubſtances to the lungs is often perceptible by their odour in the air expired. A ſimilar diminution of fluid in the lungs may be effected by determining to the ſurface of the body; and thoſe expectorants which belong to the claſs of diaphoretics probably act in this manner.

Expectorants, then, are to be regarded, not as medicines which directly aſſiſt the rejection of a fluid already ſecreted, but rather as either increaſing the natural exhalation where it is deficient, or diminiſhing the quantity of fluid where it is too copious, either by ſtimulating the pulmonary veſſels, or by determining to the ſurface. In both caſes expectoration will appear to be promoted or facilitated. *

Therap tics. The definition of theſe remedies points out the caſes to which they are applicable, viz. thoſe in which an accumulation of pus or mucus takes place in the bronchial cells, as catarrh, pneumonia in its ſuppurative ſtage, peripneumonia notha, aſthma, and phthiſis pulmonalis or conſumption.

Class III. DIAPHORETICS.

149 Definitic of diaph tics. Diaphoretics are thoſe remedies that are intended to promote, keep up, or reſtore the excretion of perſpirable matter from the ſkin; and of theſe ſome act but feebly, and only increaſe the inſenſible perſpiration, while others act more powerfully, and under favourable circumſtances, excite ſweating. Hence we may divide them into two orders.

150 Table of aphoretic

A. THE MILDER DIAPHORETICS.

I. Animal Products.

Murias ammoniæ.
Aqua carbonatis ammoniæ.
Carbonas ammoniæ, *carbonate of ammonia.*
Alcohol ammoniatum, *ammoniated alcohol.*

II. Vegetable Products.

Anthemis nobilis, *chamomile tea.*
Centaurea benedicta, *holy thiſtle tea.*
Myrrha.
Allium ſativum.
Acidum acetoſum, *acetous acid* or *vinegar.*
Acidum acetum deſtillatum, *diſtilled vinegar.*
Aqua acetitis ammoniæ, *water of acetated ammonia.*
Arctium lappa, *burdock decoction.*
Artemiſia abrotanum, *ſouthern-wood tea.*
Ariſtolochia ſerpentaria, *ſnake-root.*
Tinctura ariſtolochiæ ſerpentariæ, *tincture of ſnake-root.*
Daphne mezereum, *mezereum.*
Decoctum daphnes mezerei, *decoction of mezereum.*
Dorſtenia contrayerva, *contrayerva.*
Pulvis contrayervæ compoſitus, *compound powder of contrayerva.*
Fumaria officinalis, *fumitory.*
Laurus ſaſſafras, *ſaſſafras tea.*
Salvia officinalis, *ſage tea.*
Sambucus nigra, *elder.*
Succus bacci ſambuci ſpiſſatus, *inſpiſſated juice of elder.*
Smilax ſarſaparilla, *ſarſaparilla.*
Decoctum ſmilacis ſarſaparillæ, *decoction of ſarſaparilla.*
Solanum dulcamara, *bitter ſweet decoction.*
Supertartras potaſſæ, *ſupertartrate of potaſh*, or *cream of tartar.*

B. STRONGER DIAPHORETICS, OR SUDORIFICS.

I. Animal Products.

Moſchus moſchiferus, *musk.*
Miſtura moſchata, *musk mixture.*

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* [illegible] vol. i. p. 326.

II. Vegetable Products.

Aconitum neomontanum, *aconite.*
  Succus ſpiſſatus aconiti napelli, *inſpiſſated juice of aconite.*
Guaiacum officinale, *guaiacum wood and reſin.*
  Decoctum guaiaci officinalis compoſitum, *compound decoction of guaiacum.*
  Tinctura guaiaci officinalis, *tincture of guaiacum.*
  Tinctura guaiaci ammoniata, *ammoniated tincture of guaiacum.*
Laurus camphora, *camphor.*
  Miſtura camphorata, *camphorated mixture.*
  Emulſio camphorata, *camphorated emulſion.*
Papaver ſomniferum, *opium.*
  Tinctura opii, *tincture of opium.*
  Tinctura opii camphorata, *camphorated tincture of opium.*
  Tinctura opii ammoniata, *ammoniated tincture of opium.*
  Pulvis ipecacuanhæ et opii, *powder of ipecacuan and opium.*
Rhododendron chryſanthum, *yellow-flowered rhododendron.*

III. Mineral Products.

Sulphuretum antimonii, *ſulphuret of antimony.*
  Tartris antimonii, in ſmall doſes.
  Vinum tartritis antimonii.
  Sulphuretum antimonii præparatum.
  Sulphur ſtibii fuſcum, *brown ſulphuret of antimony.*
  Oxidum antimonii cum phoſphate calcis, *oxide of antimony with phoſphate of lime*, or *James's powder.*
  Antimonium calcinatum, *white oxide of antimony.*
  Calx ſtibii præcipitatum. D. *Precipitated oxide of antimony*, or *powder of Algaroth.*
Sulphur ſublimatum, *flowers of ſulphur.*
  Sulphur ſublimatum lotum.
  Sulphur præcipitatum, *precipitated ſulphur*, or *milk of ſulphur.*
Hydrargyrum, *mercury.*
  Hydrargyrum purificatum, *purified mercury.*
  Submurias hydrargyri, vel calomelas, *ſubmuriate of mercury*, or *calomel.*
Balneum calidum, *hot bath.*
Balneum vaporis, *vapour bath.*

151 ffects and ſes of diaphoretics. Diaphoretics act in one of two ways; ſome by exciting an increaſed action of the exhalant veſſels of the ſkin immediately, or by ſympathy with other parts, as the application of heat, the warm bath, friction, &c. while others promote perſpiration, by increaſing the general force of the circulating ſyſtem, and thus acting on the exhalant veſſels of the ſkin.

The action of diaphoretics is aſſiſted by moderate warmth and by tepid diluent liquors frequently taken.

The immediate effects of theſe medicines are partly a diminution of the quantity of fluids in the body, but principally a change of the determination of blood from other parts to the ſurface. They perhaps alſo increaſe the action of the abſorbents, and thus remove the ſpaſmodic conſtriction of the extreme veſſels.

The caſes to which diaphoretic medicines are beſt adapted, are inflammatory fevers, rheumatiſm, aſthma, dyſpepſia, obſtinate diarrhœa, and protracted dyſentery. They are injurious in typhus fever, eſpecially towards its commencement.

Where the force of the circulation is very great, it is proper, before the exhibition of diaphoretics, to premiſe the uſe of ſome other evacuation, as bleeding or purging.

Class IV. DIURETICS.

152 Definition of diuretics. Theſe are ſuch medicines as promote or increaſe the excretion of urine.

The principal diuretics are theſe.

153 Table of diuretics. I. Animal Products.

Lytta veſicatoria, *cantharides.*
  Tinctura meloes veſicatorii, *tincture of cantharides.*
Oniſcus aſellus, *millepedes*, or *wood-lice.*

II. Vegetable Products.

Aſarum europæum, *aſarabacca.*
Nicotiana tabacum, *tobacco.*
Scilla maritima, *ſquill.*
  Tinctura ſcillæ, *tincture of ſquill.*
Colchicum autumnale, *meadow ſaffron.*
  Syrupus colchici, *ſyrup of colchicum.*
  Oxymel colchici, *oxymel of colchicum.*
  Acetum colchici, *vinegar of colchicum.*
Polygala ſenega, *ſeneka root.*
  Decoctum polygalæ ſenegæ, *decoction of ſeneka.*
Acetum acetoſum, *acetous acid.*
  Acetas potaſſæ, *acetate of potaſh.*
Daphne mezereum, *mezereum.*
  Decoctum daphnes mezerei, *decoction of mezereum.*
Smilax ſarſaparilla, *ſarſaparilla.*
  Decoctum ſarſaparillæ compoſitum, *compound decoction of ſarſaparilla.*
Solanum dulcamara, *bitterſweet.*
Supertartras potaſſæ, *ſupertartrate of potaſh.*
Allium cepa, *onion.*
Ciſſampelos pareira, *pareira brava.*
Cochlearia armoracia, *horſe-radiſh.*
Copaifera officinalis, *balſam of Copaiba.*
Cynara ſcolymus, *artichoke.*
Digitalis purpurea, *foxglove.*
Juniperus communis, *juniper.*
  Spiritus juniperi communis compoſitus, *compound ſpirit of juniper.*
  Oleum juniperi communis, *oil of juniper.*
Juniperus lycia, *olibanum.*
Leontodon taraxacum, *dandelion.*
Pinus ſylveſtris, *common turpentine.*
  Oleum volatile pini puriſſimum, *purified oil of turpentine.*
Pinus larix, *Venice turpentine.*
Spartium ſcoparium, *green broom.*
Ulmus campeſtris, *elm bark.*
  Decoctum ulmi, *decoction of elm bark.*

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III. Mineral Products.

Hydrargyrum, *mercury.*

Murias hydrargyri, *corroſive muriate of mercury.*

Nitras potaſſæ, *nitrate of potaſh.*

Nitrum purificatum, *purified nitre.*

Acidum nitroſum, *nitrous acid.*

Spiritus ætheris nitroſi, *ſpirit of nitrous æther.*

134 Diluents uſed with diuretics.

The operation of diuretics is greatly promoted by plentiful dilution, which ſhould by no means be withheld from dropſical patients, though for many years paſt, the contrary method has too much prevailed. The medical world is much indebted to Sir F. Milman, for the pains he has taken to ſhew the propriety of indulging ſuch patients in the free uſe of liquids. In confirmation of the propriety of this method, the obſervation of the late Dr Cullen may be added. He has remarked that he always thought it abſurd in phyſicians to employ diuretics while they enjoined an abſtinence from drink, which is almoſt the only means of conveying theſe diuretics to the kidneys. Whenever, therefore, he employed diuretics, he at the ſame time adviſed drinking freely; and he was perſuaded that drinking largely often contributed to the cures he made.

It is obvious, ſays Mr Murray, that a diuretic effect will be produced by any ſubſtance capable of ſtimulating the ſecreting veſſels of the kidneys. All the ſaline diuretics ſeem to act in this manner. They are received into the circulation, and paſſing off with the urine, ſtimulate the veſſels, and increaſe the quantity ſecreted.

There are other diuretics, the effect of which appears to ariſe from direct application, but from an action excited in the ſtomach, and propagated by nervous communication to the ſecreting urinary veſſels. The diuretic operation of ſquill, and of ſeveral other vegetables, appears to be of this kind.

There is ſtill, perhaps, another mode in which certain ſubſtances produce a diuretic effect, that is, by promoting abſorption. When a large quantity of watery fluid is introduced into the circulating maſs, it ſtimulates the ſecreting veſſels of the kidneys, and is carried off by the urine. If, therefore, abſorption be promoted, and if a portion of ſerous fluid, perhaps previouſly effuſed, be taken up, the quantity of fluid ſecreted by the kidneys will be increaſed. In this way digitalis ſeems to act. Its diuretic effect, it has been ſaid, is greater when exhibited in dropſy, than it is in health.

On the ſame principle may probably be explained the utility of mercury in promoting the action of ſeveral diuretics.

The action of theſe remedies is promoted by drinking freely of mild diluents. It is alſo influenced by the ſtate of the ſurface of the body. If external heat be applied, diureſis is frequently prevented, and diaphoreſis produced. Hence the doſes of them ſhould be given in the courſe of the day, and the patient, if poſſible, be kept out of bed.

The direct effects of diuretics are ſufficiently evident. They diſcharge the watery part of the blood, and by [illegible] they indirectly promote abſorption over the whole ſyſtem[*].

Diuretics are now ſeldom employed, except in caſes of dropſy, and here they not unfrequently fail of ſucceſs. They are, however, occaſionally uſed in calculous or gravelly complaints, in gonorrhœa, to diminiſh plethora, or check profuſe perſpiration.

Class V. CATHARTICS.

155 Cathartics are thoſe medicines which promote or increaſe the evacuation of excrementitious matter, or of ſerous fluids, from the bowels.

There are two principal objects which modern phyſicians have in view in the adminiſtration of cathartics; one is merely to empty the bowels, and bring off the excrementitious matter contained in them, which is already out of the courſe of circulation; the other, to ſtimulate the exhalant veſſels of the bowels, and thus promote an increaſed ſecretion of ſerous fluids which they pour into the alimentary canal; in this way diminiſhing the general maſs of fluids in the body. Hence theſe medicines are naturally divided into laxatives and purgatives, the latter of which are often termed draſtic purgatives. It is true that theſe orders of cathartics differ only in degree of power, as ſuch a quantity of a laxative may be given as to induce purging, while the doſe of a purgative may be ſo diminiſhed as to prove only gently laxative. As, however, the diviſion is uſeful in ſome reſpects, we ſhall here preſerve it, and ſhall diſtribute our liſt of cathartics into laxatives and purgatives.

A. *Laxatives.*

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I. Animal Products.

Mel, *honey.*

Mel deſpumatum, *clarified honey.*

II. Vegetable Products.

Anthemis nobilis, *clyſters of chamomile decoction.*

Olea europæa, *olive oil.*

Supertartras potaſſæ, *ſupertartrate of potaſh.*

Tartras potaſſæ, *tartrate of potaſh.*

Tartras potaſſæ et ſodæ, *tartrate of potaſh and ſoda*, or *Rochelle ſalt.*

Caſſia fiſtula.

Electuarium caſſiæ, *electuary of caſſia.*

Caſſia ſenna, *ſenna.*

Pulvis ſennæ compoſitus, *compound powder of ſenna.*

Electuarium caſſiæ ſennæ, *electuary of ſenna.*

Infuſum ſennæ ſimplex, *ſimple infuſion of ſenna.*

Infuſum ſennæ tartariſatum, *tartariſed infuſion of ſenna.*

Infuſum tamarindi cum ſenna, *infuſion of tamarinds with ſenna.*

Tinctura ſennæ compoſita, *compound tincture of ſenna.*

Ficus carica, *figs.*

Fraxinus ornus, *manna.*

Syrupus mannæ, *ſyrup of manna.*

Prunus domeſtica, *prune.*

Roſa damaſcena, *damaſk roſe.*

Syrupus roſæ centifoliæ, *ſyrup of damaſk roſes.*

Saccharum officinarum, *brown ſugar.*

Tamarindus indica, *tamarind.*

Viola odorata, *ſweet violet.*

Syrupus violæ odoratæ, *ſyrup of violets.*

III. MINERAL PRODUCTS.

Sulphur ſublimatum, *flowers of ſulphur.*

Sulphur ſublimatum lotum.

Sapo Hiſpanus, *Caſtile ſoap.*

B. *Purgatives.*

I. ANIMAL PRODUCTS.

Cervus elaphus, *hart-horn.*

Phoſphas ſodæ, *phoſphate of ſoda.*

II. VEGETABLE PRODUCTS.

Nicotiana tabacum, *clyſters of tobacco*, or *of tobacco-ſmoke.*

Sambucus nigra, *elder.*

Pinus ſylveſtris, } *clyſters of turpentine.*
Larix, }

Aloe perfoliata, *ſoccotrine aloes.*

Pulvis aloes cum canella, *powder of aloes with canella.*

Pilulæ aloeticæ, *aloetic pills.*

Pilulæ aloes cum colocynthide, *pills of aloes and colocynth.*

Vinum aloes ſoccotrinæ, *aloes wine.*

Tinctura aloes ſoccotrinæ, *tincture of ſoccotrine aloes.*

Bryonia alba, *bryony.*

Convolvulus jalapa, *jalap.*

Pulvis jalapæ compoſitus, *compound powder of jalap.*

Extractum jalapæ, *extract of jalap.*

Tinctura convolvuli jalapæ, *tincture of jalap.*

Convolvulus ſcammonia, *ſcammony.*

Pulvis ſcammonii compoſitus, *compound powder of ſcammony.*

Pulvis ſcammonii cum aloe, *powder of ſcammony with aloes.*

Electuarium ſcammonii, *electuary of ſcammony.*

Cucumis colocynthis, *colocynth*, or *bitter apple.*

Extractum colocynthidis compoſitum, *compound extract of colocynth.*

Gratiola officinalis, *hedge hyſſop.*

Helleborus niger, *black hellebore.*

Extractum hellebori nigri, *extract of black hellebore.*

Helleborus fœtidus, *ſtinking hellebore.*

Iris pſeudacorus, *common flag.*

Linum catharticum, *purging flax.*

Momordica elaterium, *wild cucumber.*

Succus ſpiſſatus momordici elaterii, *elaterium.*

Rhamnus catharticus, *buckthorn.*

Syrupus rhamni cathartici, *ſyrup of buckthorn.*

Rheum palmatum, *rhubarb.*

Infuſum rhei palmati, *infuſion of rhubarb.*

Vinum rhei palmati, *rhubarb wine.*

Tinctura rhei palmati, *tincture of rhubarb.*

Tinctura rhabarbari compoſita, *compound tincture of rhubarb.*

Tinctura rhei et aloes, *tincture of rhubarb and aloes.*

Tinctura rhei et gentianæ, *tincture of rhubarb and gentian.*

Ricinus communis, *caſtor oil.*

Stalagmitis cambogioides, *gamboge.*

III. MINERAL PRODUCTS.

Sulphuretum antimonii, *ſulphuret of antimony.*

Tartris antimonii, in very ſmall doſes.

Hydrargyrum, *mercury.*

Submurias hydrargyri, *ſubmuriate of mercury.*

Submurias hydrargyri præcipitatus, *precipitated ſubmuriate of mercury.*

Pilulæ hydrargyri, *mercurial pills.*

Nitras potaſſæ.

Sulphas potaſſæ, *ſulphate of potaſh.*

Murias ſodæ, *ſea ſalt.*

Sulphas ſodæ, *ſulphate of ſoda*, or *Glauber's ſalt.*

Sulphas magneſiæ, *ſulphate of magneſia*, or *Epſom ſalt.*

The operation of a purgative medicine on the inteſtinal canal, may be conſidered as threefold. Firſt, it ſtimulates the muſcular fibres of the inteſtines, quickens their action, and thus increaſes the natural periſtaltic motion of the bowels, in conſequence of which their contents are more quickly diſcharged. Secondly, the exhalant veſſels are ſtimulated by it, which terminate in the inner coat of the inteſtines, and it excites them to pour forth a greater diſcharge of fluids, as well as the mouths of the excretory ducts of the mucous glands, by which the natural mucus of the inteſtines is greatly augmented; and hence the evacuations by ſtool are not only quicker, but the excrementitious matter is thinner and more copious. Thirdly, the ſtools are rendered ſtill more abundant, by an additional portion of the fluids furniſhed by the neighbouring viſcera, the liver, pancreas, &c. to which the ſtimulus of a purgative, of the more active ſort in particular, extends. It is probable that theſe effects are communicated to the whole range of the inteſtinal canal, from the upper orifice of the ſtomach to the lower extremity of the rectum, or anus.

From the view we have now taken of the primary effects of cathartics on the bowels, we may eaſily underſtand how far they may prove uſeful in ſome diſeaſes, and injurious in others; and how we may vary the degree of their activity under different circumſtances.

When we conſider the great length of the alimentary canal, with the numerous veſſels and mucous follicles, as well as the hepatic and pancreatic ducts, which open on its internal ſurface, it will be evident that purgatives, even though they be not very ſtimulant, may occaſion a great general evacuation, and conſequent diminution of the maſs of fluids, by opening at once all thoſe outlets. From this it appears, that next to bloodletting, purging will form one of the moſt active remedies in acute inflammatory diſeaſes, where we wiſh to avoid an over diſtenſion of the veſſels, and reſtrain the preternatural increaſe of the powers of the circulating ſyſtem. Accordingly, purging conſtitutes a principal part of what is termed the *cooling regimen.* In theſe caſes the more draſtic purgatives are to be avoided, as their uſe would be attended with ſo much ſtimulating effect on the ſyſtem in general, as to counterbalance the advantage we ſhould derive from their diminiſhing the maſs of fluids. Again, the change in the diſtribution of the blood from other parts of the ſyſtem to the bowels, is another circumſtance attending the uſe of purgatives, which renders them of conſiderable importance in ſeveral diſeaſes. It ſeems to follow, that if an evacuation be made from one ſet of veſſels, the afflux of fluids to theſe will be increaſed in order to ſupply it, and, conſequently, the afflux to other parts of the ſyſtem will be diminiſhed. Upon this principle, Dr Cullen explains the utility of purgatives in diſorders of the head, which originate from over-fulneſs or over-activity, and in mental affections, mania, phrenſy, headach, &c. The afflux of fluids in the veſſels of the abdomen, which ſupply the inteſtines, being increaſed by purging, the afflux will be proportionally diminiſhed in the veſſels which carry blood to the head, and both the quantity and impetus of the blood in the head will thus be leſſened.

The good effects of cathartics in the ſmall pox; and ſome other inflammatory affections of the ſkin, are probably to be attributed chiefly to their removing local irritation, and producing a conſiderable depletion, and thus diminiſhing the general fever that uſually attends thoſe diſeaſes.

When the contents of the bowels are morbidly retained, either in conſequence of their periſtaltic motion being unuſually ſlow from a torpid ſtate of the muſcular fibres, or from a relaxed ſtate of the bowels, favouring an accumulation of fæces, from a deficiency of bile, or from habitual neglect, the uſe of cathartics is indicated, to prevent more ſerious complaints that may be the conſequence of this coſtiveneſs. The kind of cathartics to be employed depends on the nature of the cauſe producing the conſtipation, or particular circumſtances attending it. If, for example, the coſtiveneſs be attended with a debilitated habit, with ſymptoms of great nervous mobility, flatulence, or other ſigns of a debilitated ſtate of the alimentary canal, ſome of the warmer aromatic cathartics will be proper, as aloes, rhubarb, or ſuch preparations of theſe as contain an aromatic in their compoſition. If the coſtiveneſs ſeems to ariſe from a deficiency of bile, the aloetic and mercurial purgatives are indicated.

In caſes where the coſtiveneſs has ariſen from ſome accidental cauſe, as in colic, dyſentery, enteritis, it will be neceſſary to vary the cathartics according to the nature of the affection, or the cauſe by which it has been produced. See COLIC, DYSENTERY, and ENTERITIS, MEDICINE *Index*.

Cathartics exert a particular action on the abſorbent veſſels, by which theſe are enabled to take up a greater quantity of fluid than in their natural ſtate. Hence the uſe of draſtic purgatives in dropſy. The action of cathartics in this way does not appear to be well underſtood. Dr Cullen, treating of this ſubject, obſerves that, as in every cavity of the body there is an inhalation and exhalation conſtantly going on, it is preſumed that there is ſome balance conſtantly preſerved between the ſecretory and abſorbent powers; ſo that if the former are increaſed, the latter will be alſo; and, therefore, that when the former are, upon occaſion, much increaſed, the action of the abſorbents may be particularly excited. This explains why purging often excites the *action* of the *abſorbents*, to take up more copiouſly the fluids that were otherwiſe ſtagnant in the adipoſe membrane, or other cavities of the body, and thereby often proves a cure of dropſy. This explanation is perhaps little more than an implicit ſtatement of the fact. It is certain, however, that *aſcites*, or dropſy of the abdomen, has been often affected by means of acrid draſtic purgatives, ſuch as gamboge, ſcammony, &c. when diuretic remedies have failed. But it is obvious that theſe remedies can only be adminiſtered to thoſe who retain conſiderable ſtrength of conſtitution, debilitated neither by inveterate intemperance, old age, nor a long diſeaſe.

The attention of practitioners has been lately particularly directed to the uſe of purgatives in ſeveral diſeaſes, in which they were formerly either not employed at all, or not uſed to any extent, in conſequence of a valuable publication by Dr James Hamilton, ſenior phyſician of the Edinburgh infirmary. Dr Hamilton having obſerved that in ſeveral ſpaſmodic diſeaſes, eſpecially in choria, or St Vitus's dance, there was commonly a conſiderable collection of black offenſive fæces in the bowels, was led to conceive that this muſt prove a very powerful irritating cauſe in protracting theſe diſeaſes; and as in common with other practitioners, he had experienced great want of ſucceſs from the uſual adminiſtration of tonic medicines in theſe affections, he was led to try the effect of purgatives given to ſuch an extent as to produce complete evacuation of the bowels. The plan ſucceeded entirely to his ſatisfaction, and by this treatment he finds choria is ſpeedily cured, generally in 10 days or a fortnight. Beſides choria, Dr Hamilton has been very ſucceſsful in the adminiſtration of purgatives in caſes of typhus, ſcarlatina, fever, maraſmus, chloroſis, hemateſmus, hyſteria, tetanus, and ſeveral other chronic affections. He was originally induced to purſue his new method of treating typhus, by obſerving that the antimonials, which were formerly ſo largely employed in this diſeaſe, appeared to be moſt ſerviceable when they operated upon the bowels. This led him to ſuſpect, that any purgative medicine might be ſubſtituted in their place, and that the debilitating effect of vomiting and ſweating might thus be avoided. Experience has fully confirmed theſe conjectures, and after a trial of ſome years he is thoroughly perſuaded, that the full and regular evacuation of the bowels relieves the oppreſſion of the ſtomach, and mitigates the other ſymptoms of fever. He has accordingly almoſt entirely given up the adminiſtration of other remedies, and truſts to the exhibition of frequent and copious purgatives. It might have been apprehended, that this plan of treatment would have aggravated the debility, which conſtitutes a ſtriking ſymptom of typhus; but ample experience has proved that this is not the caſe. The purgatives which Dr Hamilton * has employed in fever are calomel, calomel and jalap, jalap and cryſtals of tartar, aloes, ſolutions of mild neutral ſalts, infuſion of ſenna, and ſometimes the two laſt medicines conjoined.

Cathartics are among the moſt efficacious remedies that are employed with a view to promote or reſtore the menſtrual evacuation; and accordingly they form the chief part of thoſe remedies that are commonly called

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herapeu-tics. ed emmenagogues. With this view the drastic purgatives are chiefly given, as aloes, bryony, black hellebore, and some of the preparations of mercury.

There is another use of cathartics that may be referred to a mechanical operation, viz. their expelling worms from the bowels. See ANTHELMINTICS.

Class VI. ERRHINES.

158 efinition of errhines. Thoſe medicines are termed errhines that are employed to promote an increaſed diſcharge of mucus from the noſtrils. The principal errhines are the following.

159 able of rhines.

I. Vegetable Products.

Aſarum europæum, *aſarabacca.*
  Pulvis aſari europæi compoſitus, *compound powder of aſarabacca.*
  Cephalic ſnuff.
Nicotiana tabacum, *tobacco.*
  The ordinary ſnuffs.
Iris florentina, *Florentine orris.*
Lavandula ſpica, *lavender flowers.*
Origanum majorana, *ſweet marjoram.*
Roſmarinus officinalis, *roſemary.*
Teucrium marum, *maſtich.*
Veratrum album, *white hellebore.*

II. Mineral Products.

Hydrargyrum, *mercury.*
  Subſulphas hydrargyri flavus, *yellow ſubſulphate of mercury, or turbeth mineral.*

160 ffects and uses of rhines. The evacuation produced by the action of errhines is ſometimes procured without any ſneezing, but frequently attended with it. This, however, implies no difference, but merely that of ſtronger or weaker ſtimulus in the medicine employed. The ſneezing that occurs may have particular effects by the concuſſion it occaſions; but is does not vary the evacuation induced by the medicine, excepting that with ſneezing there is commonly a larger evacuation produced.

This evacuation often goes no further than to reſtore the natural evacuation when interrupted; but it commonly goes farther, and increaſes the evacuation beyond its uſual meaſure; and that not only for ſome time after the medicine has been applied, but alſo for ſome following days.

This evacuation not only empties, but alſo produces a larger excretion from the mucous follicles of the ſchneiderian membrane; but, agreeably to the laws of the circulation, this muſt produce an afflux of fluids from the neighbouring veſſels, and in ſome meaſure empty theſe. By this it often removes rheumatic congeſtions in the neighbouring veſſels, and particularly thoſe in which the toothach often conſiſts.

But not only the more nearly adjoining veſſels are thus relieved, but the effect may extend further to the whole of the branches of the external carotid; and we have known inſtances of headachs, pains of the ear, and ophthalmias, cured or relieved by the uſe of errhines. How far their effects may extend, cannot be exactly determined; but it is probable that they may operate more or leſs on the whole veſſels of the head, as even a branch of the internal carotid paſſes into the noſe; and independent of this, it is not improbable that our errhines may have been of uſe in preventing apoplexy and palſy; which at leaſt is to be attended to ſo far, that whenever any approach to theſe diſeaſes is ſuſpected, the drying up of the mucous diſcharge ſhould be attended to, and if poſſible reſtored.*.

Class VII. SIALAGOGUES.

161 Definition of ſialagogues. Theſe are employed either to promote an increaſed flow of ſaliva, or to produce ſuch an affection on the gums, as ſhall indicate their having been received in ſufficient quantity into the circulation. Under the former diviſion are ranked ſeveral vegetable ſubſtances; under the latter are included only mercury and its preparations.

162 Table of ſialagogues.

I. Vegetable Products.

Daphne mezereum, *mezereum.*
Amomum zingiber, *ginger.*
Anthemis pyrethrum, *pellitory of Spain.*
Piſtacia lentiſcus, *maſtich.*

II. Mineral Products.

Hydragyrum, *mercury.*
  Hydrargyum purificatum, *purified mercury.*
  Submurias hydrargyri, *ſubmuriate of mercury.*
  Murias hydrargyri, *muriate of mercury.*
  Submurias hydrargyri præcipitatus, *precipitated ſubmuriate.*
  Pilulæ hydrargyræ, *mercurial pills.*
  Oxidum hydrargyri cinereum, *cinereous oxide of mercury.*
  Unguentum hydrargyum, *mercurial ointment.*
  Hydrargyrus calcinatus, *red oxide of mercury.*
  Acetis hydrargyri, *acetate of mercury.*
  Hydrargyrus ſulphuratus ruber, *red ſulphurate of mercury.*
  Sulphuretum hydrargyri nigrum, *black ſulphuret of mercury.*

163 Uſes of ſialagogues. The vegetable ſialagogues are commonly called maſticatories, becauſe they produce their effect by being chewed in the mouth. They are employed in ſimilar caſes with the errhines, more eſpecially in toothach. The uſe of the mercurial ſialagogues will be explained hereafter in our account of mercury.

Class VIII. EMOLLIENTS.

164 Definition of emollients. The medicines commonly called emollients conſiſt either of diluting liquors, formed of ſimple water, or certain vegetable infuſions, or mucilaginous and oily matters that have the mechanical property of defending the parts to which they are applied, from the action of accrimonious ſubſtances that paſs over them; or of ſoftening and relaxing the ſkin and other external parts. The firſt of theſe are commonly called *diluents*, the ſecond *demulcents*, and the third ſimply *emollients*. We ſhall enumerate them together under the general term of emollients, reſerving an account of their particular uſes for the individual articles.

165 Table of emollients.

I. Animal Products.

Accipenſer huſo, ſturio, &c, *iſinglaſs.*
Ovis aries, *mutton ſuet.*
Phyſeter macrocephalus, *ſpermaceti.*
Sus ſcrofa, *hog's lard.*

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* Cullen's Materia Medica, vol. ii. p. [illegible]

Linimentum ſimplex, *ſimple liniment*.
Unguentum ſimplex, *ſimple ointment*.
Unguentum adipis ſuillæ, *ointment of hogs-lard*.
Unguentum ſpermatis ceti, *ſpermaceti ointment*.
Unguentum ceræ, *wax ointment*.
Ceratum ſimplex, *ſimple cerate*.
Ceratum ſpermatis ceti, *ſpermaceti cerate*.

II. Vegetable Products.

Cera alba et flava, *white and yellow wax*.
Olea Europæa.
Althæa officinalis, *marſhmallow*.
Decoctum althææ officinalis, *decoction of marſhmallow*.
Syrupus althææ, *ſyrup of marſhmallow*.
Amygdalus communis, *almonds* and *oil of almonds*.
Emulſio amygdali communis, *almond emulſion*.
Oleum amygdali communis, *oil of almonds*.
Aſtragalus tragacantha, *gum tragacanth*.
Mucilago aſtragali tragacanthi, *mucilage of tragacanth*.
Pulvis tragacanthi compoſitus, *compound powder of tragacanth*.
Avena ſativa, *oat meal*.
Cocos butyracea, *palm oil*.
Eryngium maritimum, *eryngo root*.
Glycyrrhiza glabra, *liquorice root, and extract*.
Trochiſci glycyrrhizæ, *liquorice lozenges*.
Hordeum diſtichon, *barley*.
Decoctum hordei diſtichi, *barley water*.
Decoctum hordei compoſitum, *compound decoction of barley*.
Lilium candidum, *white lily root*.
Linum uſitatiſſimum, *lintſeed*.
Oleum lini uſitatiſſimi, *lintſeed oil*.
Malva ſylveſtris, *common mallow*.
Decoctum pro enemate, *decoction for clyſters*.
Meliſſa officinalis, *balm*.
Mimoſa nilotica, *gum arabic*.
Mucilago mimoſæ niloticæ, *mucilage of gum arabic*.
Emulſio mimoſæ niloticæ, *common emulſion*.
Trochiſci gummoſi, *gum lozenges*.
Penæa ſarcocolla, *ſarcocolla*.
Pyrus cydonia, *quince ſeed*.
Mucilago ſeminis cydonii mali, *mucilage of quince ſeed*.
Triticum hibernum, *wheat and ſtarch*.
Mucilago amyli, *mucilage of ſtarch*.
Trochiſci amyli, *ſtarch lozenges*.
Vitis vinifera, *raiſins*.

Diluents are chiefly employed to abate thirſt in fever and inflammatory affections, or to promote the action of other remedies, particularly diaphoretics and diuretics. Demulcents are chiefly uſed in catarrh, pneumonia, dyſentery, diarrhœa, gonorrhœa; and external emollients are employed chiefly in caſe of ſprains and bruiſes, or to defend the ſurface of ulcers from the dreſſings and bandages.

Class IX. REFRIGERANTS.

Definition

Under this term are comprehended thoſe remedies which are employed with a view to diminiſh the preternaturally increaſed heat that takes place in the body during fever and local inflammatory affections.

The following are the principal refrigerants enumerated by the various writers on the materia medica.

I. Vegetable Products.

Acidum acetoſum, *acetous acid*.
Acetis potaſſæ, *acetate of potaſh*.
Aqua acetitis ammoniae, *water of acetate of ammonia*.
Supertartras potaſſæ, *ſupertartrate of potaſh*.
Tamarindus indica, *tamarinds*.
Berberis vulgaris, *barberry*.
Citrus medica, *lemon*.
Syrupus citri medicæ, *ſyrup of lemon juice*.
Citrus aurantia, *orange*.
Cochlearia officinalis, *ſcurvy graſs*.
Succus cochleariæ compoſitus, *compound juice of ſcurvy graſs*.
Morus nigra, *mulberry*.
Syrupus fructus mori, *ſyrup of mulberry juice*.
Oxalis acetoſella, *wood ſorrel*.
Conſerva acetoſellæ, *conſerve of ſorrel*.
Ribes nigrum, *black currants*.
Succus ſpiſſatus ribis nigri, *inſpiſſated juice of black currants*.
Syrupus ſucci ribis nigri, *ſyrup of black currant juice*.
Ribes rubrum, *red currants*.
Roſa canina, *dog roſe* or *hips*.
Conſerva roſæ caninæ, *conſerve of hips*.
Rubus idæus, *raſpberry*.
Syrupus fructus rubi idæi, *ſyrup of raſpberry juice*.
Rumex acetoſa, *common ſorrel*.
Veronica beccabunga, *brooklime*.

II. Mineral Products.

Sulphas zinci, *ſulphate of zinc*.
Nitras potaſſæ, *nitrate of potaſh*.
Acidum nitroſum, *nitrous acid*.
Spiritus ætheris nitroſi, *ſpirit of nitrous ether*.
Trochiſci nitratis potaſſæ, *nitre lozenges*.
Murias ſodæ, *muriate of ſoda*.
Acidum muriaticum, *muriatic acid*.
Acidum ſulphuricum, *ſulphuric acid*.
Acidum ſulphuricum dilutum, *diluted ſulphuric acid*.
Plumbum, *lead*.
Superacetas plumbi, *ſuperacetate* or *ſugar of lead*.
Aqua lithargyri acetati, *water of acetated litharge*, or *Goulard's extract*.
Aqua lithargyri acetati compoſita, *compound water of acetated litharge*.
Unguentum acetitis plumbi, *ointment of acetate of lead*.
Ceratum lithargyri acetati compoſitum, *compound ſerate of acetated litharge*.
Affuſion of cold water.

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Refrigerants appear to act chemically, but in what preciſe manner they diminiſh the heat of the human body, is not well underſtood. On this ſubject Mr Murray expreſſes himſelf in the following manner.

"Keeping in view the very inconſiderable action of theſe remedies, it may perhaps be poſſible, from the conſideration of the mode in which animal temperature is generated, to point out how their trivial refrigerant effects may be produced.

"It has been sufficiently established, that the consumption of oxygen in the lungs is materially influenced by the nature of the food received into the stomach; that it is increased by animal food and spirituous liquors, and in general by whatever substances contain a small quantity of oxygen in their composition. But the temperature of animals is derived from the consumption of oxygen by respiration. An increase of that must occasion a great evolution of caloric in the syſtem, and increase of temperature, while a diminution in the consumption of oxygen must have an opposite effect. If, therefore, when the temperature of the body is morbidly increased, ſubſtances be introduced into the ſtomach containing a large proportion of oxygen, eſpecially in a ſtate of looſe combination, and capable of being aſſimilated by the digeſtive powers, the nutritious matter received into the blood muſt contain a larger portion of oxygen than uſual; leſs of that principle will be conſumed in the lungs, by which means leſs caloric being evolved, the temperature of the body muſt be reduced; and this operating as a reduction of ſtimulus, will diminiſh the number and force of the contractions of the heart.

"It might be ſuppoſed that any effect of this kind muſt be trivial, and it actually is ſo. It is, as Cullen has remarked, not very evident to our ſenſes, nor eaſily ſubjected to experiment, and is found only in conſequence of frequent repetitions *."

Refrigerants are conſidered by Mr Murray as acting chemically, but we are not certain how far this opinion is correct. That ſome of them do operate in cooling the human body, merely as chemical agents, cannot be denied; but ſeveral ſeem to produce this effect by ſome particular action on the nervous ſyſtem, that is not well underſtood.

Class X. ASTRINGENTS.

Aſtringents are defined by Dr Cullen to be ſuch ſubſtances as when applied to the human body produce a condenſation and contraction of the ſoft ſolids, and thereby increaſe their denſity and force of coheſion. If they are applied to longitudinal fibres, the contraction is made in the length of theſe; but if applied to circular fibres, the diameters of the veſſels, or the cavities which theſe ſurround, are diminiſhed.

The principal ſubſtances that act in this way are taken from vegetables, and conſiſt of the barks of ſeveral trees, certain roots and inſpiſſated juices; but a few of them are derived from minerals, eſpecially the ſtronger mineral acids, a few metallic and earthy ſalts, and according to ſome writers, alcohol. We ſhall enumerate the following.

I. Vegetable Products.

Hæmatoxylon campechianum, *logwood.*
  Extractum ligni hæmatoxyli campechiani, *extract of logwood.*
Juglans regia, *walnut.*
Eucalyptus reſinifera, *kino.*
  Tinctura kino, *tincture of kino.*
Mimoſa catechu, *catechu, or Japan earth.*
  Infuſum mimoſæ catechu, *infuſion of catechu.*
  Tinctura mimoſæ catechu, *tincture of catechu.*
  Electuarium catechu, *electuary of catechu.*
Polygonum biſtorta, *biſtort.*
Potentilla reptans, *potentilla.*
Prunus ſpinoſa, *ſloe.*
  Conſerva pruni ſylveſtris, *conſerve of ſloes.*
Pterocarpus draco, *dragon's blood.*
Punica granatum, *pomegranate, balauſtines.*
Quercus cerris, *galls.*
Quercus robur, *common oak.*
Roſa gallica, *red roſe.*
  Infuſum roſæ gallicæ, *infuſion of roſes.*
  Conſerva roſæ gallicæ, *conſerve of red roſes.*
  Syrupus roſæ gallicæ, *ſyrup of red roſes.*
  Mel roſæ, *honey of roſes.*
Tormentilla erecta, *tormentil root.*
Vitis vinifera, *red Port wine.*

II. Mineral Products.

Acidum ſulphuricum, *ſulphuric acid.*
Acidum muriaticum, *muriatic acid.*
Ferrum, *iron.*
  Tinctura muriatis ferri, *tincture of muriated iron.*
Plumbum, *lead.*
  Superacetas plumbi, *ſuperacetate of lead.*
Sulphas cupri, *ſulphate of copper.*
  Solutio ſulphatis cupri, *ſolution of ſulphate of copper.*
Liquor cupri ammoniati, *liquor of ammoniated copper.*
Sulphas zinci, *ſulphate of zinc.*
  Aqua zinci vitriolati cum camphora, *water of vitriolated zinc with camphor.*
  Solutio acetitis zinci, *ſolution of acetate of zinc.*
Superſulphas aluminæ et potaſſæ, *ſuperſulphate of alumina and potaſh*, or *alum.*
  Sulphas aluminæ exſiccatus, *dried ſulphate of alumina.*
  Pulvis ſulphatis aluminæ compoſitus, *compound powder of ſulphate of alumina.*
  Aqua aluminis compoſita, *compound alum water.*
  Cataplaſma aluminis, *cataplaſm of alum.*

It is of ſome conſequence that the preciſe meaning of the term aſtringent, uſed as a medicine, ſhould be underſtood.

The uſual method of detecting aſtringency is, by the [illegible] corrugating of the tongue, and the peculiar rough and harſh ſenſation communicated to the palate by the touch of an aſtringent ſubſtance; and in general, all bodies may be called aſtringents, that have the property of communicating theſe ſenſations. Moſt of the vegetable aſtringents have beſides the property of ſtriking a black colour when mixed with a ſolution of ſulphate of iron, and this property has been conſtantly conſidered as one of the ſureſt teſts of aſtringency in vegetable ſubſtances. Now modern chemiſtry has ſhewn, that this property is owing to a peculiar acid, viz. the gallic, and not to tannin or the aſtringent principle properly ſo called. It ſo happens that in moſt vegetable aſtringents the gallic acid and tannin are found united, but in ſome, eſpecially catechu, the aſtringent principle exiſts without gallic acid, and conſequently no black colour is produced when a ſolution of catechu is added to a ſolution of iron. Hence the [illegible]

[illegible] that the above property is not a ſure teſt of [illegible] aſtringency. A more certain chemical teſt is [illegible] jelly; for, when a ſolution of this is added to a ſolution of vegetable aſtringent, a copious precipitate is produced, which in fact is leather.

Aſtringents appear to act nearly in a ſimilar manner on the dead animal fibre as on the living ſolid, in both caſes thickening and hardening: when applied to the living ſolid, they produce increaſe of tone and ſtrength, reſtrain inordinate actions, and check exceſſive diſcharges from any of the veſſels or cavities; and to the dead fibre occaſion denſity, toughneſs, imperviouſneſs to water in a greater or leſs degree, and inſuſceptibility to the common cauſes of putrefaction. See TANNING.

173 Practical uſes. Aſtringents are largely employed in medicine, and their uſe is attended with conſiderable advantage. The caſes in which they are moſt beneficial, and in which their effect ſeems moſt unequivocally owing to the aſtringent principle, are diarrhœas, leucorhœa, and gleets. They have alſo been employed with ſucceſs for reſtraining profuſe evacuations where they could not be immediately applied to the affected part, as in the above caſes; for example, in hemoptiſis and epiſtaxis; but here their operation ſeems to be leſs attributable to their aſtringency than to their tonic power.

Such aſtringents as are employed externally to check hemorrhage from divided veſſels, are uſually called ſtyptics.

CLASS IX. TONICS.

174 Definition [illegible] Tonics are thoſe medicines which are ſuited to counteract debility, or to give ſtrength and energy to the moving fibres. They are taken partly from vegetables, and partly from minerals.

175 [illegible]

I. VEGETABLE PRODUCTS.

Anthemis nobilis, *chamomile flowers.*
Centaurea benedicta, *holy thiſtle.*
Marrubium vulgare, *horehound.*
Myrrha, *myrrh.*
  Pulvis myrrhæ compoſitus, *compound powder of myrrh.*
Dorſtenia contrajerva, *contrayerva.*
  Pulvis contrayervæ compoſitus, *compound powder of contrayerva.*
Vitis vinifera.
  Vinum rubrum luſitanum, *red port wine.*
Æſculus hippocaſtanum, *horſe cheſnut bark.*
Anguſtura, *anguſtura bark.*
Chironea centaureum, *leſſer centaury.*
Cinchona officinalis, *Peruvian bark.*
  Infuſum cinchonæ officinalis, *infuſion of cinchona.*
  Decoctum cinchonæ officinalis, *decoction of cinchona.*
  Tinctura cinchonæ officinalis, *tincture of cinchona.*
  Tinctura cinchonæ compoſita, *compound tincture of cinchona.*
  Tinctura cinchonæ ammoniata, *ammoniated tincture of cinchona.*
  Extractum cinchonæ officinalis, *extract of cinchona.*
Cinchona caribæa, *Caribean cinchona.*
Colomba, *colomba root.*
  Tinctura colombæ, *tincture of colomba.*
Croton eleutheria, *caſcarilla bark.*
  Tinctura caſcarillæ, *tincture of caſcarilla.*
  Extractum caſcarillæ, *extract of caſcarilla.*
Gentiana lutea, *gentian root.*
  Infuſum gentianæ compoſitum, *compound infuſion of gentian.*
  Tinctura gentianæ compoſita, *compound tincture of gentian.*
  Vinum gentianæ compoſitum, *compound wine of gentian.*
  Extractum gentianæ, *extract of gentian.*
Menyanthes trifoliata, *marſh trefoil.*
Quaſſia excelſa, *quaſſia.*
Quaſſia ſimaruba, *ſimarouba.*
Salix fragilis, *fragile willow bark.*
Salix alba, *white willow bark.*
Swietenia mahagoni, *mahogany tree bark.*
Swietenia febrifuga, *febrifuge ſwietenia,*
Tanacetum vulgare, *common tanſey.*

Therapeutics.

I. MINERAL PRODUCTS.

Sulphas cupri, *ſulphate of copper.*
  Ammoniaretum cupri, *ammoniaret of copper.*
  Pilulæ ammoniareti cupri, *pills of ammoniaret of copper.*
Zincum, *zinc.*
  Sulphas zinci, *ſulphate of zinc.*
  Solutio ſulphatis zinci, *ſolution of ſulphate of zinc.*
  Oxidum zinci, *oxide* or *flowers of zinc.*
Nitras potaſſæ, *nitrate of potaſh.*
  Acidum nitroſum, *nitrous acid.*
Ferrum, *iron.*
  Carbonas ferri, *carbonate of iron.*
  Carbonas ferri præcipitatus, *precipitated carbonate of iron.*
  Aqua ferri aërati, *water of aerated iron.*
  Sulphas ferri, *ſulphate of iron.*
  Vinum ferri, *wine of iron.*
  Tinctura muriatis ferri, *tincture of muriate of iron.*
  Sulphas ferri exſiccatus, *dried ſulphate of iron.*
  Oxidum ferri rubrum, *red oxide of iron.*
  Emplaſtrum oxidi ferri rubri, *plaſter of red oxide of iron.*
  Ferri limaturæ purificatæ, *purified filings of iron.*
  Oxidum ferri nigrum purificatum, *purified black oxide of iron.*
  Murias ammoniæ et ferri, *muriate of ammonia and iron.*
  Tinctura ferri ammoniacalis, *tincture of ammoniacal iron.*
  Tartras ferri et potaſſæ, *tartrate of iron and potaſh.*
  Tinctura ferri acetati, *tincture of acetated iron.*
Acidum ſulphuricum, *ſulphuric acid.*
  Acidum ſulphuricum dilutum, *diluted ſulphuric acid.*

Acidum sulphuricum aromaticum, *aromatic sulphuric acid.*

Argentum, *silver.*

Nitras argenti, *nitrate of silver*, or *lunar cauſtic.*

Arſenicum, *arſenic.*

Carbonas barytæ, *carbonate of baryta.*

Carbonas calcis, *carbonate of lime* or *chalk.*

Solutio muriatis calcis, *ſolution of muriate of lime.*

Solutio barytæ, *ſolution of baryta.*

Murias barytæ, *muriate of baryta.*

Solutio muriatis barytæ, *ſolution of muriate of baryta.*

Aquæ minerales ferrum continentes, *chalybeate mineral waters.*

III. Gaseous Products.

Gas oxigenium, *oxygen gas.*

176 Balneum frigidum, *cold bath.*

Equitatio, *riding on horſeback.*

Moſt tonics act immediately on the ſtomach, and hence on the ſyſtem at large. They increaſe the appetite, quicken digeſtion, and add vigour to the body. Hence they are uſeful in moſt caſes of debility; but when uſed improperly or for too long a time, they prediſpoſe to apoplectic and paralytic diſorders.

Class XII. STIMULANTS.

177 Moſt of the articles of the Materia Medica might, in an extended ſenſe, be called *ſtimulants;* but this term is, by the general conſent of phyſicians, reſtrictively applied to thoſe medicines which poſſeſs the power of ſuſtaining or increaſing the vital energies—of raiſing and invigorating the action of the heart and arteries—and of reſtoring to the muſcular fibre, when affected with torpor, its loſt ſenſibility and power of motion. Hence the uſe, under proper regulations, of the various articles belonging to this claſs in caſes of gout, palſy, and malignant typhoid fever: but let it be repeated, under proper regulations; for we cannot but remark that medicines which give additional activity to the circulation, and which augment the heat and ſenſibility of the ſyſtem throughout, are often abuſively employed, being adminiſtered too early, as well as too freely in the above-mentioned and ſome other ſimilar diſorders. In the beginning of typhous fever, in particular, it cannot be doubted that a haſty and laviſh exhibition of ſuch medicines has, in numerous inſtances, aggravated every ſymptom, and brought the patient, who would otherwiſe have had the diſeaſe in its mildeſt form, into conſiderable danger *.

Synopſis Materia Medica, vol. ii. 154.

The claſs of ſtimulants is exceedingly numerous, and might, perhaps, with advantage, be ſubdivided into ſections; but as this ſubdiviſion would admit of much diſpute from the different acceptation of the term *ſtimulant*, we ſhall here only give a table of ſtimulants diſtributed as uſual into animal, vegetable, and mineral products.

I. Animal Products.

178 Murias ammoniæ, *muriate of ammonia.*

Aqua ammoniæ, *water of ammonia.*

Alcohol ammoniatum, *ammoniated alcohol.*

Carbonas ammoniæ, *carbonate of ammonia.*

Aqua carbonatis ammoniæ, *water of carbonate of ammonia.*

Oleum ammoniatum, *ammoniated oil.*

Linimentum ammoniæ, *liniment of ammonia.*

Linimentum volatile, *volatile liniment.*

Alcohol ammoniatum aromaticum, *aromatic ammoniated alcohol.*

Spiritus ammoniæ ſuccinatus, *ſuccinated ſpirit of ammonia.*

Moſchus moſchiferus, *muſk.*

Miſtura moſchata, *muſk mixture.*

Cervus elaphus, *hartſhorn.*

Liquor volatilis cornu cervi, *volatile liquor of hartſhorn.*

Sal cornu cervi, *ſalt of hartſhorn.*

Lytta veſicatoria, *cantharides.*

Tinctura meloes veſicatorii, *tincture of cantharides.*

Unguentum infuſi meloes veſicatorii, *ointment of infuſion of cantharides.*

Unguentum pulveris meloes veſicatorii, *ointment of powder of cantharides.*

Ceratum cantharidis, *cerate of cantharides.*

Emplaſtrum meloes veſicatorii, *plaſter of cantharides.*

II. Vegetable Products.

Sinapis alba, *muſtard ſeed.*

Cataplaſma ſinapios, *muſtard cataplaſm.*

Allium ſativum, *garlic.*

Arum maculatum, *wake-robin.*

Conſerva ari, *conſerve of arum.*

Pimpinella aniſum, *aniſe ſeed.*

Oleum volatile pimpinellæ aniſi, *volatile oil of aniſe ſeed.*

Styrax benzoin, *benjamin.*

Acidum benzoicum, *benzoic acid.*

Tinctura benzoes compoſita, *compound tincture of benjamin.*

Alcohol.

Æther ſulphuricus, *ſulphuric æther.*

Æther ſulphuricus cum alcohole, *ſulphuric æther with alcohol.*

Æther ſulphuricus cum alcohole compoſitus, *compound ſulphuric æther with alcohol.*

Oleum vini, *oil of wine.*

Acidum acetoſum, *vinegar.*

Acidum acetoſum forté, *ſtrong acetous acid.*

Acidum acetoſum camphoratum, *camphorated acetous acid.*

Acetum aromaticum, *aromatic vinegar.*

Ariſtolochia ſerpentaria, *ſnake-root.*

Tinctura ariſtolochiæ ſerpentariæ, *tincture of ſnake-root.*

Daphne mezereum, *mezereum.*

Decoctum daphnes mezerei, *decoction of mezereum.*

Guaiacum officinale, *guaiacum.*

Decoctum guaiaci officinalis, *decoction of guaiacum.*

Tinctura guaiaci officinalis, *tincture of guaiacum.*

Tinctura guaiaci ammoniata, *ammoniated tincture of guaiacum.*

[illegible]

Tinctura opii, *tincture of opium.*

Tinctura opii camphorata, *camphorated tincture of opium.*

Tinctura opii ammoniata, *ammoniated tincture of opium.*

Confectio opiata, *opiate confection.*

Cochlearia armoracia, *horſe radiſh.*

Copaifera officinalis, *balſam of copaiba.*

Pinus ſylveſtris, } *turpentine and roſin.*
Pinus larix, }

Oleum volatile pini puriſſimum, *purified oil of turpentine.*

Unguentum reſini flavi, *ointment of yellow roſin.*

Ceratum reſini flavi, *cerate of yellow roſin.*

Emplaſtrum ceræ, *wax plaſter.*

Unguentum picis, *pitch plaſter.*

Unguentum picis burgundicæ, *ointment of burgundy pitch.*

Arnica montana, *leopard's bane.*

Bubon galbanum, *galbanum.*

Pilulæ galbani compoſitæ, *compound pills of galbanum.*

Emplaſtrum galbani compoſitum, *compound plaſter of galbanum.*

Juniperus ſabina, *ſavine.*

Oleum juniperi ſabinæ, *oil of ſavine.*

Juniperus Lycia, *olibanum.*

Paſtinaca opoponax, *opoponax.*

Veratrum album, *white hellebore.*

Unguentum hellebori albi, *ointment of white hellebore.*

Decoctum hellebori albi, *decoction of white hellebore.*

Acorus calamus, *calamus aromaticus*, or *ſweet flag.*

Amomum zingiber, *ginger.*

Syrupus amomi zingiberis, *ſyrup of ginger.*

Tinctura amomi zingiberis, *tincture of ginger.*

Amomum repens, *leſſer cardamom ſeeds.*

Tinctura amomi repentis, *tincture of cardamom.*

Tinctura cardamomi compoſita, *compound tincture of cardamom.*

Amyris gileadenſis, *balm of gilead.*

Amyris elemifera, *gum elemi.*

Unguentum elemi, *elemi ointment.*

Anethum fœniculum, *ſweet fennel ſeed.*

Oleum volatile fœniculi dulcis, *oil of fennel.*

Aqua fœniculi dulcis, *fennel water.*

Anethum graveolens, *dill ſeed.*

Aqua anethi, *dill water.*

Angelica archangelica, *angelica.*

Apium petroſelinum, *parſley root and ſeed.*

Arbutus uva urſi, *whortle berry.*

Artemiſia maritima, *ſea wormwood.*

Conſerva abſinthii maritimi, *conſerve of ſea wormwood.*

Decoctum pro fomento, *decoction for fomentation.*

Canella alba, *white canella.*

Capſicum annuum, *capſicum, Cayenne pepper.*

Carum carvi, *caraway ſeeds.*

Oleum carvi, *oil of caraway.*

Spiritus cari carvi, *ſpirit of carraway.*

Ciſtus creticus, *ladanum.*

Emplaſtrum ladani, *ladanum plaſter.*

Citrus aurantium, *Seville orange peel.*

Oleum volatile citri aurantii, *eſſence of orange-peel.*

Aqua citri aurantii, *orange peel water.*

Tinctura aurantii corticis, *tincture of orange-peel.*

Syrupus citri aurantii, *ſyrup of orange-peel.*

Conſerva citri aurantii, *conſerve of orange-peel.*

Coriandrum ſativum, *coriander ſeed.*

Crocus ſativus, *ſaffron.*

Syrupus croci, *ſyrup of ſaffron.*

Tinctura croci, *tincture of ſaffron.*

Cuminum cyminum, *cummin ſeed.*

Cataplaſma cumini, *cummin cataplaſm.*

Emplaſtrum cumini, *cummin plaſter.*

Curcuma longa, *turmeric.*

Daucus carota, *wild carrot ſeed, carrot root.*

Dianthus caryophyllus, *clove Julyflower.*

Syrupus caryophylli rubri, *ſyrup of cloves.*

Eugenia caryophyllata, *cloves.*

Oleum volatile caryophylli aromatici, *oil of cloves.*

Hypericum perforatum, *St John's wort.*

Inula helenium, *elecampane root.*

Kœmpferia rotunda, *zedoary.*

Lavandula ſpica, *lavender flowers.*

Oleum volatile lavandulæ ſpicæ, *oil of lavender.*

Spiritus lavandulæ ſpicæ, *ſpirit of lavender.*

Spiritus lavandulæ compoſitus, *compound ſpirit of lavender.*

Laurus cinnamomum, *cinnamon.*

Oleum volatile lauri cinnamomi, *oil of cinnamon.*

Aqua lauri cinnamomi, *cinnamon water*

Spiritus lauri cinnamomi, *ſpirit of cinnamon.*

Tinctura lauri cinnamomi, *tincture of cinnamon.*

Tinctura cinnamomi compoſita, *compound tincture of cinnamon.*

Pulvis aromaticus, *aromatic powder.*

Electuarium aromaticum, *aromatic electuary.*

Laurus caſſia, *caſſia bark.*

Aqua lauri caſſiæ, *caſſia water.*

Laurus nobilis, *bay tree.*

Lobelia ſyphilitica, *blue cardinal flower.*

Melaleuca leucadendron, *cajeput oil,*

Mentha viridis, *ſpearmint.*

Oleum menthæ ſativæ, *oil of mint.*

Aqua menthæ ſativæ, *mint water.*

Spiritus menthæ ſativæ, *ſpirit of mint.*

Mentha piperita, *peppermint.*

Oleum volatile menthæ piperitæ, *oil of peppermint.*

Aqua menthæ piperitæ, *peppermint water.*

Spiritus menthæ piperitæ, *ſpirit of peppermint.*

Mentha pulegium, *pennyroyal.*

Oleum volatile menthæ pulegii, *oil of pennyroyal.*

Aqua menthæ pulegii, *pennyroyal water.*

Spiritus menthæ pulegii, *ſpirit of pennyroyal.*

Myriſtica moſchata, *nutmeg.*
Spiritus myriſticæ moſchatæ, *ſpirit of nutmeg.*
Myroxylon Peruiferum, *balſam of Peru.*
Tinctura balſami Peruviani, *tincture of balſam of Peru.*
Myrtus pimenta, *pimento*, or *Jamaica pepper.*
Oleum volatile myrti pimentæ, *oil of pimento.*
Aqua myrti pimentæ, *pimento water.*
Spiritus myrti pimentæ, *ſpirit of pimento.*
Origanum vulgare, *origanum.*
Oleum origani, *oil of origanum.*
Panax quinquefolium, *ginſeng.*
Parietaria officinalis, *pellitory of the wall.*
Pinus balſamea, *balſam of Canada.*
Piper nigrum, *black pepper.*
Piper cubeba, *cubebs.*
Piper longum, *long pepper.*
Piſtacia terebinthus, *Chio turpentine.*
Rhus toxicodendron, *poiſon oak.*
Styrax officinale, *ſtorax.*
Styrax purificata, *ſtrained ſtorax.*
Toluifera balſamum, *balſam of Tolu.*
Tinctura toluiferæ balſami, *tincture of balſam of Tolu.*
Syrupus toluiferæ balſami, *ſyrup of balſam of Tolu.*
Trigonella foenum græcum, *fœnugreek ſeed.*
Urtica dioica, *ſtinging nettle.*
Wintera aromatica, *winter's bark.*

III. Mineral Products.

Hydrargyrum, *mercury.*
Unguentum oxidi hydrargyri rubri, *ointment of red oxide of mercury.*
Unguentum nitratis hydrargyri, *ointment of nitrate of mercury.*
Unguentum nitratis hydrargyri mitius, *milder ointment of nitrate of mercury.*
Nitras potaſſæ, *nitrate of potaſh.*
Acidum nitroſum, *nitrous acid.*
Acidum nitricum, *nitric acid.*
Unguentum acidi nitroſi, *ointment of nitrous acid.*
Sapo Hiſpanus, *Caſtile ſoap.*
Tinctura ſaponis, *tincture of ſoap.*
Tinctura ſaponis et opii, *tincture of ſoap and opium.*
Ceratum ſaponis, *ſoap cerate.*
Emplaſtrum ſaponis, *ſoap plaſter.*
Murias ſodæ, *muriate of ſoda.*
Murias ſodæ exſiccatus, *dried muriate of ſoda.*
Acidum ſulphuricum, *ſulphuric acid.*
Acidum arſenioſum, *arſenious acid.*
Bitumen petroleum, *petroleum.*
Oleum petrolei, *oil of petroleum.*
Subboras ſodæ, *ſubborate of ſoda*, or *borax.*
Subacetas cupri, *ſubacetate of copper*, or *verdigriſe.*
Oxymel æruginis, *oxymel of verdigriſe.*
Unguentum acetitis cupri, *ointment of ſubacetate of copper.*
Calx, *quicklime.*
Linimentum aquæ calcis, *liniment of lime water*

IV. Gaseous Products.

Gas oxygenium, *oxygen gas.*
Gas oxidum azotii, *gaſeous oxide of azote.*
Electriſatio et galvaniſatio, *electricity and galvaniſm.*

Balneum calidum, *the hot bath.*

The ſubſtances enumerated in the above table have been variouſly denominated, according to their real or ſuppoſed medical virtues. Of the internal ſtimulants, moſt have been called cordials, from the effect they have in raiſing the ſpirits; ſome have been termed carminatives, (ſee *carminatives*), under which head rank moſt of the aromatic herbs, roots, and ſeeds. Of the external ſtimulants many are called rubefacients, from the effect they have in irritating and conſequently reddening the ſkin; and of theſe the principal are muſtard, cantharides, and the ſtinging nettle.

Class XIII. ANTISPASMODICS.

179
Definition of antiſpaſmodics.

Thoſe medicines which have been found by experience to put a ſtop to convulſive motions, or ſpaſmodic contractions of the muſcular fibres, are called *antiſpaſmodics.* Moſt of them are ſtimulants, ſome narcotics, and ſome are conſidered as ſpecific antiſpaſmodics.

Table of Antispasmodics.

180
Table of Antiſpaſmodics.

I. Animal Products.

Murias ammoniæ, *muriate of ammonia.* See table of *Stimulants.*
Moſchus moſchiferus, *muſk.*
Miſtura moſchata, *muſk mixture.*
Cervus elaphus.
Oleum animale, *animal oil.*
Caſtor fiber, *caſtor.*
Tinctura caſtorei, *tincture of caſtor.*
Tinctura caſtorei compoſita, *compound tincture of caſtor.*

II. Vegetable Products.

Cephaëlis ipecacuanha, *ipecacuanha.*
Nicotiana tabacum, *tobacco ſmoke.*
Ferula aſafœtida, *aſafetida.*
Alcohol ammoniatum fœtidum, *fetid ammoniated alcohol.*
Pilulæ aſafœtidæ compoſitæ, *compound pills of aſafetida.*
Emplaſtrum aſafœtidæ, *aſafetida plaſter.*
Alcohol.
Æther ſulphuricus, *ſulphuric æther.*
Laurus camphora, *camphor.*
Emulſio camphorata, *camphorated emulſion.*
Miſtura camphorata, *camphorated mixture.*
Tinctura camphoræ, *tincture of camphor.*
Linimentum camphoræ compoſitum, *compound liniment of camphor.*
Papaver ſomniferum, *opium.*
Tinctura opii, *tincture of opium.*
Tinctura opii camphorata, *camphorated tincture of opium.*

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Tinctura opii ammoniata, *ammoniated tincture of opium.*

Electuarium opiatum, *opiate electuary.*

Pilulæ opii, *opium pills.*

Bubon galbanum, *galbanum.*

Tinctura galbani, *tincture of galbanum.*

Pilulæ galbani compoſitæ, *compound pills of galbanum.*

Vitis vinifera.

Vinum rubrum luſitanum, *red Port wine.*

Citrus aurantium, *orange leaves.*

Artemiſia abſynthium, *common wormwood.*

Sub-carbonas potaſſæ impurus, *impure ſubcarbonate of potaſh.*

Aqua potaſſæ, *water of potaſh*, or *ſoap ley.*

Cardamine pratenſis, *ladies ſmock.*

Conium maculatum, *hemlock.*

Succus ſpiſſatus conii maculati, *inſpiſſated juice of hemlock.*

Fuligo ligni combuſti, *wood ſoot.*

Hyoſcyamus niger, *henbane.*

Succus ſpiſſatus hyoſcyami nigri, *inſpiſſated juice of henbane.*

Valeriana officinalis, *valerian.*

Tinctura valerianæ, *tincture of valerian.*

Tinctura valerianæ ammoniata, *ammoniated tincture of valerian.*

Extractum valerianæ ſylveſtris reſinoſum, *reſinous extract of wild valerian.*

III. Mineral Products.

Hydrargyrum, *mercury.*

For moſt preparations of mercury, ſee table of Sialogogues.

Bitumen petroleum, *petroleum.*

Oleum petrolei, *oil of petroleum.*

Succinum, *amber.*

Oleum ſuccini, *oil of amber.*

Oleum ſuccini puriſſimum, *purified oil of amber.*

Sal ſuccini, *ſalt of amber.*

Spiritus ammoniæ ſuccinatus, *ſuccinated ſpirit of ammonia.*

Effects and uſes of antiſpaſmodics.

All thoſe ſubſtances which, whether introduced into the body or applied to its ſurface, have been found by experience to put a ſtop to convulſive movements or rigid contractions of the muſcular fibres, are termed antiſpaſmodics. Of theſe ſubſtances there are many which differ from each other very widely, both in reſpect of ſenſible qualities and chemical compoſition; which indeed is not ſurpriſing, when it is conſidered that ſpaſmodic affections occur in various and even oppoſite ſtates of the body; a circumſtance which calls for nice diſcrimination on the part of the practitioner in the uſe of theſe remedies. Some of them being conſiderably ſtimulant in their operation, aggravate rather than alleviate ſpaſm, when aſſociated with plethora or obſtruction. It is therefore of great importance to attend carefully to the ſtate of the patient's body, previouſly to the exhibition of theſe medicines; to premiſe and accompany their uſe in epilepſy, chorea, and hyſteria, by proper evacuations; and to ſelect from the great variety of articles which this claſs contains, ſuch as are beſt adapted to the particular form of ſpaſm which it is our buſineſs to cure.

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CLASS XIV. NARCOTICS.

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Definition of narcotic

This term has been uſually applied to thoſe remedies which are calculated to relieve pain and procure ſleep. They have alſo been termed anodynes and hypnotics, and moſt of them were formerly ranked in the claſs of ſedatives.

Table of Narcotics.

183
Table of narcotics.

I. Vegetable Products.

Nicotiana tabacum, *tobacco.*

Vinum nicotianæ tabaci, *tobacco wine.*

Aconitum neomontanum, *aconite.*

Succus ſpiſſatus aconiti napelli, *inſpiſſated juice of aconite.*

Papaver ſomniferum, *opium; white poppy heads.*

Tinctura opii, *tincture of opium.*

Tinctura opii camphorata, *camphorated tincture of opium.*

Syrupus opii, *ſyrup of opium.*

Extractum papaveris ſomniferi, *extract of white poppy heads.*

Pulvis opiatus, *opiate powder.*

Electuarium opiatum, *opiate electuary.*

Pilulæ opii, *opium pills.*

Rhododendron chryſanthum, *yellow-flowered rhododendron.*

Digitalis purpurea, *foxglove.*

Tinctura digitalis purpureæ, *tincture of foxglove.*

Arnica montana, *leopard's bane.*

Rhus toxicodendron, *poiſon oak.*

Conium maculatum, *hemlock.*

Succus ſpiſſatus conii maculati, *inſpiſſated juice of hemlock.*

Hyoſcyamus niger, *henbane.*

Succus ſpiſſatus hyoſcyami nigri, *inſpiſſated juice of henbane.*

Tinctura hyoſcyami nigri, *tincture of henbane.*

Atropa belladonna, *deadly nightſhade.*

Datura ſtramonium, *thorn-apple.*

Humulus lupulus, *hop.*

Lactuca viroſa, *wild lettuce.*

Papaver rhœas, *wild poppy.*

Syrupus papaveris erratici, *ſyrup of wild poppy.*

Sium nodiflorum, *creeping ſkerrit.*

184
Effects and uſes of narcotics.

There is no claſs of medicines in the adminiſtration of which more judgement and diſcrimination are requiſite than in the adminiſtration of thoſe which are termed narcotics. When given in full doſes, much good or much miſchief is ſure to follow, according as they are prudently or miſtakingly preſcribed. What a common practice it is to give them whenever a patient complains of pain, without duly inveſtigating the cauſe of that pain; whether it be the conſequence of high inflammatory action, of a plethoric condition, or of a ſuppreſſion of ſome periodical or habitual diſcharge! In theſe caſes to preſcribe any of the medicines belonging to this claſs, clafs, in a full or confiderable dofe, before the remedies fuited to remove inflammation, plethora, and obftruction had been reforted to, would only ferve to aggravate the difeafe. And even where there is no condition of the body which contraindicates the ufe of narcotics, it is of great importance to adapt the dofes not only to the age and conftitution of the patients, but likewife to the particular form of the difeafe. For inftance, in tetanus, hemicrania, and colica pictonum, opium, and other narcotic medicines, may be given in large dofes with excellent effect; but in phthifis pulmonalis, typhus fever, and fome other ftates of debility, fmall dofes, repeated at proper intervals, are found to anfwer beft.

In the adminiftration of narcotics, it is moreover proper to confider whether in the particular cafe in which they appear to be indicated, they fhould be prefcribed alone, or in combination with other medicines; and if in the manner laft mentioned, with what fort of adjuncts. Thus, in cafes of fynochus, acute rheumatifm, and the early ftage of dyfentery, they fhould be given in combination with calomel and antimonials; in cafes of afthma and phthifis pulmonalis, with ammoniacum, fquill, and other expectorants; in cafes of cholera, with diluents and demulcents; in cafes of diarrhœa, with aftringents and aromatics; in hemorrhagic cafes, with fulphate of zinc and other ftyptics; in hyfteria, with the volatile alkali, ether, and fœtids; in convulfive affections, efpecially fuch as occur in children, with magnefia and other antacids *.

Class XV. ANTHELMINTICS.

185 Definition of anthelmintics.

Thofe medicines which are employed with a view to expel worms from the bowels, are called *anthelmintics*.

Table of Anthelmintics.

186 Table of anthelmintics.

I. Animal Products.

Murias ammoniæ, *muriate of ammonia*.
  Aqua carbonatis ammoniæ, *water of carbonate of ammonia*.

II. Vegetable Products.

Anthemis nobilis, *chamomile flowers*.
  Extractum anthemidis nobilis, *extract of chamomile*.
Nicotiana tabacum, *tobacco* in clyfters.
Olea europæa, *olive oil* in clyfters.
Allium fativum, *garlic*.
Ferula afafœtida, *afafetida* in clyfters.
Convolvulus jalapa, *jalap*.
Convolvulus fcammonia, *fcammony*.
  Pulvis fcammonii compofitus, *compound powder of fcammony*.
Helleborus fœtidus, *ftinking hellebore*.
Rheum palmatum, *rhubarb* in fmall dofes.
Ricinus communis, *caftor oil*.
Stalagmitis cambogioides, *gamboge*.
Ruta graveolens, *rue*.
  Oleum volatile rutæ, *oil of rue*.
Juglans regia, *walnut rind*.
Tanacetum vulgare, *tanfy*.
Valeriana officinalis, *valerian*.
Artemifia fantonica, *wormfeed*.
Dolichos pruriens, *cowhage*.
Geoffræa inermis, *cabbage tree bark*.
Polypodium filix mas, *male fern root*.
Spigelia marilandica, *Carolina pink*.

III. Mineral Products.

Hydrargyrum, *mercury*.
  Submurias hydragyri, *fubmuriate of mercury*.
Murias fodæ, *muriate of foda*.
Ferrum, *iron*.
  Carbonas ferri, *carbonate of iron*.
  Sulphas ferri, *fulphate of iron*.
  Ferri limaturæ purificatæ, *purified iron filings*.
  Tartris ferri et potaffæ, *tartrate of iron and potafh*.
Calx, *lime*.
  Aqua calcis, *lime water* in clyfters.
Stannum, *tin*.
  Stanni pulvis, *powder of tin*.

Of the medicines which belong to this clafs, fome are faid to deftroy the different fpecies of worms which breed in the alimentary canal, by their chemical, others by their mechanical action upon thofe animals; but by far the greater number of anthelmintic or vermifuge medicines operate in no other manner than as draftic purges, bringing away the morbid accumulation of flime from the inteftines, and with the flime, the worms which were lodged in it. After the worms have been brought away by thefe remedies, the bowels fhould be ftrengthened by bitters and other tonic medicines; and the ufe of green vegetables, or much garden ftuff of any kind, and of malt liquor, fhould be forbidden.

ufes of anthelmintics.

Class XVI. CHEMICAL REMEDIES.

188 Chemical remedies.

Several of the fubftances that have been enumerated in the foregoing tables, act alfo on the animal fyftem merely as chemical re-agents, either by counteracting acidity, diffolving calculous concretions, deftroying fungous excrefcences, &c. We fhall here enumerate all the fubftances that may be confidered as chemical remedies, and fhall afterwards clafs them according to their particular action.

Table of Chemical Remedies.

I. Animal Products.

189 Table of chemical remedies.

Murias ammoniæ, *muriate of ammonia*.
  Aqua ammoniæ, *water of ammonia*.
  Carbonas ammoniæ, *carbonate of ammonia*.
  Aqua carbonatis ammoniæ, *water of carbonate of ammonia*.
  Sal cornu cervi, *falt of hartfhorn*.
Cervus elaphus, *hartfhorn*.
  Phofphas calcis, *phofphate of lime*.
  Cornu cervi uftum præparatum, *burnt hartfhorn*.
Cancer aftacus, *crabs eyes*.
Cancer pagurus, *crabs claws*.
  Chelæ cancrorum præparatæ, *prepared crabs claws*.
  Pulvis è chelis cancrorum compofitus, *compound powder of crabs claws*.
Gorgonia nobilis, *red coral*.
  Corallium rubrum præparatum, *prepared red coral*.

Oſtrea edulis, *oyſter ſhells.*

Teſtæ oſtreæ præparatæ, *prepared oyſter ſhells.*

Spongia officinalis, *ſponge.*

Spongia uſta, *burnt ſponge.*

II. Vegetable Products.

Carbonas potaſſæ, *carbonate of potaſh.*

Aqua potaſſæ, *water of potaſh*, or *cauſtic ley.*

Potaſſa, *potaſh.*

Potaſſa cum calce, *potaſh with lime.*

Carbonas potaſſæ, *carbonate of potaſh.*

Carbonas potaſſæ puriſſimus, *purified carbonate of potaſh.*

Aqua carbonatis potaſſæ, *water of carbonate of potaſh.*

Aqua ſupercarbonatis potaſſæ, *water of carbonate of potaſh.*

III. Mineral Products.

Sulphas cupri, *ſulphate of copper.*

Sulphuretum antimonii, *ſulphuret of antimony.*

Murias antimonii, *muriate of antimony.*

Sulphur ſublimatum, *flowers of ſulphur.*

Sulphuretum potaſſæ, *ſulphuret of potaſh.*

Hydroſulphuretum ammoniæ, *hydroſulphuret of ammonia.*

Nitras potaſſæ, *nitrate of potaſh.*

Acidum nitroſum, *nitrous acid.*

Acidum nitricum, *nitric acid.*

Sapo hiſpanus, *Caſtile ſoap.*

Murias ſodæ, *muriate of ſoda.*

Acidum muriaticum, *muriatic acid.*

Sulphas magneſiæ, *ſulphate of magneſia.*

Carbonas magneſiæ, *carbonate of magneſia.*

Magneſia, *magneſia.*

Trochiſci magneſiæ, *lozenges of magneſia.*

Acidum ſulphuricum, *ſulphuric acid.*

Acidum ſulphuricum dilutum, *diluted ſulphuric acid.*

Superſulphas aluminæ et potaſſæ, *ſuperſulphate of alumina and potaſh*, or *alum.*

Sulphas aluminæ exſiccatus, *dried ſulphate of alum.*

Argentum, *ſilver.*

Nitras argenti, *nitrate of ſilver.*

Oxidum arſenioſum, *arſenious acid.*

Calx, *quicklime.*

Aqua calcis, *lime water.*

Bolus gallicus, *French bole.*

Carbonas calcis, *carbonate of lime*, *chalk.*

Carbonas calcis præparatus, *prepared carbonate of lime.*

Pulvis carbonatis calcis compoſitus, *compound powder of carbonate of lime.*

Trochiſci carbonatis calcis, *lozenges of carbonate of lime.*

Potio carbonatis calcis, *potion of carbonate of lime.*

Aqua aëris fixi, *water of fixed air.*

Carbonas ſodæ impurus, *impure carbonate of ſoda.*

Carbonas ſodæ, *carbonate of ſoda.*

Aqua ſupercarbonatis ſodæ, *water of ſupercarbonate of ſoda.*

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191 Antacids.

Of the ſubſtances above enumerated, ſome act as antacids, correcting morbid anticidity in the ſtomach and bowels; as moſt of the preparations of ammonia, burnt hartſhorn, crabs eyes and claws, coral, egg ſhells, carbonates of potaſh and ſoda with their preparations, magneſia, lime, and carbonate of lime. Theſe have been often called *abſorbents.*

192 Lithontri tics.

Several of the chemical remedies act in a greater or leſs degree as lithontriptics, or ſuch medicines as are capable of diſſolving urinary calculi. The principal lithontriptics are, ſolutions of cauſtic potaſh, ſoap, ſulphuric and muriatic acids, and carbonate of ſoda.

" From the exhibition of alkaline remedies," ſays Mr Murray, " the ſymptoms ariſing from a ſtone in the bladder are very generally alleviated; and they can be given to ſuch an extent, that the urine becomes ſenſibly alkaline, and is even capable of exerting a ſolvent power on theſe concretions. Their adminiſtration cannot, however, be continued to this extent for any conſiderable length of time, from the ſtrong irritation they produce on the ſtomach and urinary organs. The uſe, therefore, of the alkalies as ſolvents, or lithontriptics, is now ſcarcely ever attempted; they are employed merely to prevent the increaſe of the concretion, and to palliate the painful ſymptoms, which they do, apparently by preventing the generation of lithic acid, or the ſeparation of it by the kidneys; the urine is thus rendered leſs irritating, and the ſurface of the calculus is allowed to become ſmooth.

" When the alkalies are employed with this view, they are generally given ſaturated, or even ſuper-ſaturated with carbonic acid. This renders them much leſs irritating. It at the ſame time diminiſhes, indeed, their ſolvent power; for the alkaline carbonates exert no action on the urinary calculi; but they are ſtill equally capable of correcting that acidity in the *primæ viæ*, which is the cauſe of the depoſition of lithic acid from the urine, and therefore ſerve equally to palliate the diſeaſe. And when their acrimony is thus leſſened, their uſe can be continued for any length of time *."

From the inconſiderable action which moſt of the lithontriptics can with ſafety be made to exert, when given by the mouth, it was ſome years ago propoſed to apply them directly to the calculus, by injecting them through the urethra into the bladder. † In this way it is evident that their action muſt be much greater, and when the ſubſtances are uſed in a ſtate of ſufficient dilution, the practice is ſaid to be perfectly ſafe.

193 Eſcharoti

Several of the chemical remedies are employed externally as cauſtics or eſcharotics, to deſtroy fungous or callous parts of the body; to open an ulcer, or to change the diſeaſed ſurface of a ſore. The principal eſcharotics are, ſulphuric and muriatic acid when concentrated; pure potaſh, nitrate of ſilver, muriate of antimony, ſulphate and ſubacetate of copper, corroſive muriate of mercury, and arſenious acid.

A few are employed both externally and internally, to check putrefaction, or to correct the unpleaſant ſmell of particular ſecretions, or of ulcers. The principal of theſe are charcoal, and carbonic acid, though the mineral acids have alſo this effect.

* *Murra Elementi* vol. i. p. 365.

† See *F te's Succeſſfu Practice Veſicæ L turæ.*

PART III. PRINCIPLES OF PHARMACY.

CHAP. I. *General Operations of Pharmacy.*

THE operations of pharmacy are either mechanical or chemical. By the firſt the various articles employed in medicine are reduced to a proper ſtate for exhibition, by cutting, raſping, grinding, pounding, &c.; and by the ſecond they are ſubjected to various complex operations, which produce certain chemical changes in their nature and properties.

To the firſt of theſe heads we may refer the collection and preſervation of ſimples. This chiefly refers to theſe articles that are of a vegetable nature, and which are either uſed freſh, or in a dried ſtate.

194 ollection nd prefer-ation of mples.

Vegetables ſhould be gathered chiefly from thoſe ſoils in which they naturally delight, or in which they are found moſt commonly to riſe ſpontaneouſly; for though many of them may be raiſed, and made to grow with vigour in very different ſoils, their virtue generally ſuffers by the change. A variation of ſeaſons occaſions alſo differences conſiderable enough to require often an allowance to be made in the quantity; plants in general proving weaker, though more luxuriant, in rainy than in dry ſeaſons. Herbs and flowers are to be gathered in a clear dry day, after the morning dew is gone off from them. Leaves, for the moſt part, are in their greateſt perfection, when come to their full growth, juſt before the flowers appear: flowers, when moderately expanded; ſeeds, when they begin to grow dry, before they fall ſpontaneouſly; woods and barks, as is ſuppoſed, in the winter; annual roots, before the ſtalks begin to riſe; biennial roots, in the autumn of the firſt year; perennial roots, in the autumn after the leaves have fallen, or early in the ſpring before they begin to vegetate.

Of the vegetables which loſe their virtue in being dried, the greater number, perhaps all, may be preſerved for a conſiderable length of time, by impeding the exhalation of their natural moiſture; for ſo long as they retain this, they ſeem to retain alſo their medical activity. Thus, roots have their virtue preſerved by being buried in ſand, which ſhould be dry, that they may not vegetate; leaves and flowers, of a more corruptible nature than roots, by being beaten with about thrice their weight of fine ſugar to prevent their corruption, and kept in a cloſe veſſel.

Plants which bear drying, are commonly hung in a warm airy place, defended from the ſun. The colours of herbs and flowers are for the moſt part changed or deſtroyed in drying, by the ſun's beams; but that their medicinal virtue ſuffers a like diminution, does not appear. This much is certain, that the heat of a culinary fire, equal to that of the ſun in ſummer, does them no injury in either reſpect; and that both flowers and leaves, when thus haſtily dried by fire, preſerve the livelineſs of their colour, and their ſmell and taſte, more perfectly than by ſlow drying. The leaves of moderately juicy plants are reduced, by drying, to about one fourth of their original weight.

Some roots, and ſome other parts of vegetables, how thoroughly ſoever they have been dried, are liable, in keeping, to grow mouldy and carious. This inconvenience might probably be obviated by dipping them, when dried, in boiling ſpirit of wine, or expoſing them to its vapour in a cloſe veſſel. It is ſaid, that ſome of the oriental ſpices are made leſs periſhable, by being dipt in a mixture of lime and water *.

The drawers in which vegetable drugs are kept, ſhould be made of ſuch materials as are not likely to impart to them any unpleaſant taſte or ſmell; and the better to avoid this, they ſhould be lined with paper. Such matters as are volatile, or which are likely to ſuffer from expoſure to the air, or from inſects, ſhould be kept in glaſs veſſels well ſtopped. Such fruits and oily ſeeds as are liable to become rancid, by being too warm, ſhould be preſerved in a dry cool place.

As moſt vegetable ſubſtances loſe much of their ſenſible properties by long keeping, or acquire others which render them leſs proper for being uſed as internal medicines, they ſhould be frequently replaced.

195 Pulverization.

One of the moſt common operations to which dry drugs are ſubjected, is that of being reduced to powder, by which they are rendered more efficacious, and are more conveniently exhibited. The pulverization of theſe matters is uſually performed by means of peſtles and mortars. Theſe ſhould be made of ſuch materials as are not likely to impart to the powdered ſubſtance any noxious properties, and ſhould at the ſame time be ſufficiently hard, not to be broken or worn away during the operation. For the powdering of barks, roots, and ſimilar ſubſtances, caſt-iron mortars are the moſt convenient; and for ſuch articles as are of a more brittle nature, mortars of glaſs or marble are commonly employed. All thoſe made of copper, or any of its alloys, ſhould be carefully avoided, as when the ſubſtance is very hard, or of ſuch a nature as to act chemically on the metal, ſome portion of copper may be mixed with the medicine, and render it a virulent poiſon. For many purpoſes mortars made of common ſtoneware anſwer very well; but the beſt mortars of this kind are thoſe made of well baked clay, commonly called *Wedgewood's mortars*. The bottom of all theſe mortars ſhould be hollow on the inſide, and flat on the outſide, and their ſides ſhould be moderately inclined. Thoſe which are employed for reducing to powder ſuch ſubſtances as produce much duſt, ſhould be provided with covers, both to prevent the lighter parts of the powder from being loſt, and to defend the operator from being injured by ſuch ſubſtances as are of a corroſive or poiſonous nature. In general, wooden covers that have a rim to prevent their ſliding off, and a hole ſufficiently large to admit of the introduction of the peſtle, anſwer very well; but where it is of conſequence that no part of the article ſhould eſcape, it is better to tie round the mouth of the mortar, and round the peſtle, a piece of pliable leather, ſufficiently large to admit of the free motion of the latter. Where this is not done, it will be proper for the operator to cover his mouth and noſe with a handker-

chief.

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* *Lewis's Materia Medica.*

[illegible] or wet cloth, and to stand in such a situation as that a current of air shall direct the acrid powder from him.

To avoid losing too much of these light dry powders, a little spirit of wine, or oil, is sometimes put into the mortar, to prevent the lighter parts of the powder from riſing. Care ſhould, however, be taken, that the ſubſtances be of ſuch a nature as not to be diſſolved by the ſpirit, nor injured by the rancidity that the oil is likely to acquire; and in every caſe, as little as poſſible of either ſhould be employed.

It is obvious that in reducing drugs to powder, too much of the article ſhould not be put at once into the mortar

Several ſubſtances require previous preparation before powdering; herbs, woods, roots, ſhould be perfectly dry, and ſhould be either ſliced or raſped before putting into the mortar; and ſuch roots as are covered with a very fibrous bark, ſhould be ſhaved after this has been removed, to take away ſuch hairy filaments as are uſually found between the bark and the wood. Gummy reſinous ſubſtances, ſuch as myrrh, which are liable to become ſoft when heated, ſhould be powdered in very cold weather; and it is better, firſt to reduce them to a coarſe powder, and expoſe this to the air for a day or two, before completing the pulverization, which will then be more eaſily effected. Some ſubſtances cannot be reduced to powder without the addition of ſome other matter; thus, camphor requires a little alcohol or oil; the emulſive ſeeds require the addition of ſome dry powder, and for aromatic oily ſubſtances, the addition of a little ſugar is proper.

196 Sifting. In order to ſeparate the finer powder from the reſt of the ſubſtance, apothecaries employ ſieves of various forms. For ſuch articles as require to be kept cloſe, the ſieve is compoſed of three parts; a middle part, which is properly the ſieve for ſeparating the finer part of the powder, a bottom for receiving the powder, and a top for preventing the eſcape of the finer duſt.

When as much of the powder as is ſufficiently fine, has paſſed through the ſieve, the reſt is to be returned into the mortar, and the pulverization continued and repeated, till as much as poſſible has paſſed the ſieve. All the parcels of powder are then to be intimately mixed together, by rubbing them for a conſiderable time in the mortar.

197 Trituration. Trituration conſiſts in rubbing dry ſubſtances that are already pretty ſmall in order to reduce them to a very fine powder, or to mix them intimately together. In the ſmall way it is performed in the uſual mortars; in the large way by means of a roller moved by water or by horſes.

198 Levigation. When it is required to reduce dry ſubſtances to a very fine, or what is called an *impalpable powder*, recourſe is had to the operation called *levigation*, which is nothing more than rubbing the ſubſtance for a long time in a broad flat mortar, or upon a hard ſtone, with a muller, adding from time to time a little water or alcohol, ſo as to reduce the ſubſtance operated on to a kind of paſte. This paſte is rubbed till it is as ſmooth as poſſible, and is then ſpread on a ſtone or flat cake of chalk, till it is ſufficiently dried. Sometimes levigated powders are made up into little conical lumps, and dried in that form. The ſubſtances on which levigation is performed are chiefly earths and metallic oxides.

For the purpoſe of reducing metals into minute particles, they are either filed or granulated. It would not be improper that apothecaries ſhould always prepare their own iron filings, as thoſe procured from a ſmith's ſhop are generally very impure. The granulation of metals is effected by melting the metal, and either ſtirring it briſkly with an iron rod till it is cold, or pouring it into water and ſtirring it as before; or laſtly, by pouring it into a covered box, having its inſide well rubbed with chalk, in which it is well ſhaken till cold, when the adhering chalk is to be waſhed away. 199 Granulation.

Another mode of procuring the fineſt particles of ſuch ſubſtances as are not ſoluble in water, is by what is termed *elutriation*, which is performed by diffuſing in water the powder or paſte to which they have been reduced by pulverization or levigation, and after the coarſer particles have ſubſided, pouring off the water that holds in ſuſpenſion the finer parts. The operation of levigation and ſubſequent diffuſion is repeated, till as much as is required of the fine powder is obtained. This is afterwards to be ſeparated from the water, either by decantation or filtration. 200 Elutriation.

When the powder is ſo heavy as readily to fall to the bottom of the veſſel, it is moſt conveniently ſeparated by decanting off the water, either by pouring it gently off as long as it comes over clear, or by means of a crooked glaſs ſyphon fixed in a board that goes over the mouth of the veſſel to keep it ſteady, as repreſented at fig. 201 Decantation.

When the powder does not readily ſubſide, it is beſt ſeparated by filtration, which is performed by means of a cone of common blotting paper, inſerted into a funnel, or by means of a cloth or flannel bag. After all the fluid has paſſed through the filter, the powder that remains on the paper is to be carefully dried. 202 Filtration.

Decantation and filtration are more commonly employed to obtain any liquor clear from the powdery or other matters with which it is mixed.

For obtaining the juices of vegetables or fruits, or the oils of ſeeds, &c. recourſe is had to *expreſſion*. The plants or fruits are put into bags or wrappers made of haircloth, and ſubjected to ſtrong preſſure by means of a ſcrew preſs, the plates of which ſhould be made of wood or tin, and by no means of lead. The preſſure employed ſhould at firſt be gentle, and ſhould be increaſed gradually. The oily ſeeds or nuts are preſſed between iron plates, which are uſually warmed; but when uſed cold, the oil is milder and not ſo liable to become rancid. 203 Expreſſion.

Beſides the mortars mentioned above, there are ſeveral other inſtruments employed in the operations of pharmacy, on which it is proper to make a few remarks.

Funnels ought to be made of tinned iron, or of glaſs; or of the ſame ſort of baked earth or clay as the mortars, or of ſilver or of block tin. 204 Funnels.

Veſſels uſed for preparing infuſions, or for evaporating liquors, or for putting decoctions or other liquors into, to cool, ought to be made either of porcelain, or of Wedgewood's ware, or of baked clay, or of earth ſuch as the mortars are made of, or of glaſs; or ſuch veſſels as are not acted upon either by acid or alkaline liquors. 205 Infuſing veſſels.

For

ınciples of harmacy. For the ſame reaſons, meaſures of all ſorts, from the dram to the quart, ought to be made of tinned iron, or of ſtoneware, or of the baked earth or clay, or of glaſs; ſilver might be employed for the ſmaller meaſures of drams and ounces, and if taken care of, would in the end prove cheaper than the others: if other metallic veſſels are uſed, the metal ought to be of ſuch a ſort as not to be affected by acid or alkaline, or other liquors; and they ought at all times to be kept extremely clean.

In diſtilling, in melting, and in calcining different bodies, no veſſels ought to be employed which may be acted upon by, and give a noxious quality to, the ſubſtances to be prepared.

Moſt colleges of phyſicians in Europe formerly directed, that both weights and meaſures ſhould be employed for diſpenſing medicines, ordering ſolid ſubſtances to be prepared by weight, fluid by meaſure; and they gave tables of the weights and meaſures they wiſhed ſhould be uſed, in the beginning of their different diſpenſatories: but it having been found that the promiſcuous uſe of weights and meaſures gave ſometimes occaſion to miſtakes, the colleges of Edinburgh and of Stockholm have, in the laſt edition of their pharmacopœias, rejected entirely the uſe of meaſures, and ordered both fluid and ſolid ſubſtances to be prepared by weight. It is to be wiſhed that all the colleges in Europe would follow their example.

206 ſeaſures od weights Meaſures made to contain a certain determined weight of water are certainly very uſeful in pharmacy; but if ſuch are allowed they ought to be employed only for meaſuring watery liquors, as the ſpecific gravities of other fluids differ ſo much from one another.

In every country, all weights and meaſures uſed for the preparation of medicines ought to be made according to the directions of the college of phyſicians; ſtandards of them ought to be kept in proper places, and all thoſe ought to be ſtamped, to ſhew that they were made according to the ſtandard.

The principal *chemical* operations of pharmacy may be arranged under the following heads.

207 ıfuſing. 1. The infuſing certain ſubſtances in cold or in hot water, or in wine, to extract their ſaline or light gummy parts, together with ſome of their fine volatile principles, which are miſcible with water.

208 oiling. 2. The boiling them in water to extract the ſame principles, together with others that are more fixed, or which are capable of being diſſolved by heat, and afterwards of being kept ſuſpended by the gummy and mucilaginous parts which have been diſſolved in the water; thus a certain proportion of reſin is found to be ſuſpended in decoctions of the bark, of opium, and of other drugs.

209 vaporaon. 3. The evaporating watery infuſions and decoctions, and the expreſſed juices of many vegetables, to obtain their fixed parts which have been diſſolved in a watery menſtruum. In this manner jellies, robs, and extracts, are prepared.

210 ıgeſting. 4. The infuſing or digeſting certain vegetable ſubſtances in pure vinous ſpirit to extract their fine volatile oils and their reſinous parts; or in ſpirit mixed with water, called proof-ſpirit, to extract along with thoſe principles, ſome of their gummy parts.

5. The evaporating of ſuch tinctures to obtain their reſinous and more fixed parts: in which way reſinous extracts are got from bark, jalap, from opium, and from other ſubſtances. Principles of Pharmacy.

211 Diſtillation. 6. The diſtilling fragrant vegetable ſubſtances with water, in order to procure their fine volatile principles, which come over with the water into the veſſels placed to receive it. In this manner the ſimple diſtilled waters (as they are called), which have the flavour and taſte of the ſubſtances from which they are diſtilled, are prepared; and the fine eſſential oils of the plants which have been diſtilled are found either floating on the top of the water, or ſunk to the bottom of it, according as they are ſpecifically lighter or heavier than water.

7. The diſtilling of the ſame ſubſtances in vinous ſpirit to obtain the ſame fragrant volatile parts, intimately united with the ſpirit; in which manner are made the ſpirituous liquors improperly called ſpirituous waters.

In diſtilling, care ought to be taken to make the vapours which ariſe condenſe properly in the veſſels ſet to receive them when they have aſſumed the form of a liquor; which is to be effected, 1. By regulating the fire, and never raiſing the degree of heat beyond what is neceſſary; and, 2. By making the vapours paſs through ſuch a cool medium, as will condenſe them into a liquid.

1. The degree of heat is regulated by the figure of the furnace in which the fire is placed, and by the quantity of wood or of coal that is uſed. Where a great degree of heat is wanted, the veſſels are put in an open fire, placed in a reverberatory furnace. Where a leſs degree of heat is ſufficient, they are put into ſand contained in an iron pot, below which the fire is lighted in a common furnace. Where a ſtill ſmaller degree is required, the veſſel is put into a pot with ſand, and a lamp in place of coals fixed below it. At other times the retort, or veſſel with the liquor to be diſtilled, is put into a veſſel full of water or other liquor, ſet over a fire, ſo that it cannot be heated beyond a certain degree.

2. The condenſation of vapours ariſing from ſubſtances ſubjected to diſtillation is effected, as before obſerved, by making the vapour paſs through ſuch a cool medium, as will condenſe it into a liquor before it reaches the bottom of the veſſels ſet to receive it.

In diſtilling medicated waters or ſpirits, the herbs or other vegetable ſubſtances, and the water or the ſpirit, are put into a ſtill placed in a proper furnace, on which is fixed a large head, with a long crane-necked or curved tube coming from the top of it, which after deſcending and going off a little to one ſide, enters into the upper end of a long ſpiral pipe, called a worm, which is fixed in a large caſk, called the worm-tub or refrigeratory, with its two ends piercing the caſk; and to its lower end is fixed a proper veſſel for receiving the diſtilled liquor. The worm-tub, which has a cock at the lower part of it for letting out water occaſionally, is filled with cold water before the diſtillation begins, and is renewed in the courſe of the diſtillation if it begins to heat, by drawing it off by means of the cock, and pouring freſh cold water into the worm-tub. After every thing is fitted, the fire is lighted, and the diſtillation is continued ſo long as the water comes over ſufficiently impregnated with the vegetable ſubſtances put into the ſtill.

In the diſtillation of vegetable or animal ſubſtances [illegible]

[illegible] with water, or with spirit, it ought to be obſerved, 1. That there ought to be put into the ſtill ſuch an additional quantity of water as will prevent the ſaid ſubſtances which are ſubject to the diſtillation from being burnt, as this additional water does not at all weaken the produce; for the moſt volatile parts of the ſubject riſe firſt, and impregnate the liquor which firſt comes over, and the water remains behind in the ſtill. 2. That a gentle fire, ſuch as is juſt capable of keeping the liquor boiling, is preferable to a ſtrong fire, particularly towards the end of the proceſs. 3. That the diſtillation is to be continued ſo long as the liquor comes over fully impregnated with the volatile parts of the vegetable ſubſtances which are the ſubjects of the diſtillation; but is to be put an end to, ſo ſoon as it is perceived to become weak, which is known by taſting from time to time the liquor which comes over.

8. The diſtilling of vegetable or animal ſubſtances in retorts without water, in order to make them riſe, and bring over by the force of fire, their watery parts, an acid, or volatile alkaline ſalt, according to what nature the ſubſtances are of, and an empyreumatic oil, into the receiver; and to get the more fixed, earthy, and oily parts, which are left behind in the retort.

In diſtilling ſubſtances which require a greater degree of heat to raiſe their volatile parts, than the liquors above mentioned, or which are of ſuch a nature as to act upon, and corrode the veſſels employed in theſe proceſſes juſt mentioned, it is neceſſary to uſe the veſſels made of glaſs or of earth, which have been called retorts, from their neck being bent on one ſide. Such retorts are employed in pharmacy for diſtilling the mineral and the vegetable acids, and the preparations made from them; in diſtilling animal and vegetable ſubſtances by themſelves to procure their watery, ſaline, or oily parts; for purifying quickſilver, and preparing the *muriate of antimony*, &c. and they may be uſed as ſubliming glaſſes for making mercurial and other preparations.

In diſtilling with retorts, the matter to be diſtilled is put into the retort, which is commonly placed in ſand, contained in an iron pot, fixed above a furnace, into which the fire is put; but on ſome particular occaſions, where only a ſmall degree of heat, not exceeding that of boiling water, is wanted, the retort is placed in a water-bath.

After the retort containing the matter to be diſtilled is fixed, the end of it is either put immediately into the mouth of another long-necked veſſel called a receiver (from its being placed to receive the diſtilled liquor), and the two veſſels are luted together by means of a proper cement; or it is firſt put into the end of a long glaſs tube called an adopter, which is luted to it, and the other end of the tube is put into the mouth of the receiver, and fixed to it by means of a cement.

The receivers are either made round like a decanter, without any other opening than the mouth; or they are made with a tube coming out from their bottom, or from the ſide near it, to which another receiver may be fixed, and when they are thus made they are called tubulated receivers, and are very convenient for performing proceſſes where the matter put into the retort yields products of different kinds, as in the diſtillation of ſpirit with the mineral acids; for the receiver or bottle luted to the tube may be changed as the different products come over, ſo that each of them may be [illegible] obtained ſeparately. And in diſtilling ſubſtances which yield very volatile products, one tubulated retort may be put after another ſo as to enlarge the ſpace for the condenſion of vapours; and in diſtilling theſe very volatile ſubſtances it is ſometimes neceſſary to make a ſmall puncture into the lutes between the retort and the receiver, to allow ſome of the vapour to eſcape to prevent its burſting the veſſels.

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The uſe of the long intervening tube called an adopter, which is put often between the retort and the receiver, is to increaſe the diſtance from the retort (that is immediately expoſed to heat) to the receiver; ſo that the receiver may be in leſs danger of being heated, and that the vapour may be cooled in its paſſage through this tube, and condenſe more readily in the receiver. It is likewiſe of another uſe, which is to give us an opportunity of ſeeing the vapour in its paſſage from the retort to the receiver, ſo that we may know how the diſtillation is going forward, and when it is proper to change the receivers, when the different liquors come over from materials which yield products of different kinds.

212 Incineration.

9. The burning vegetable ſubſtances in an open veſſel to obtain a fixt alkaline ſalt.

10. The burning the bones of animals, or the ſhells of fiſhes, to procure their earthy parts; in which manner the calcined hartſhorn, the powder of crabs claws, and of oyſter ſhells, are procured.

213 Neutralization.

11. The mixing acid and alkaline ſalts in a fluid ſtate, to form the neutral ſalts, which may be ſeparated from the water either by evaporating, with a ſlow heat, ſuch a quantity of the water as to allow the ſalts to ſhoot into cryſtals when ſet in a cool place, or by continuing the evaporation till the ſalts become dry.

12. The diſſolving certain metallic ſubſtances, or certain earths, in acid liquors, for obtaining metallic and earthy ſalts, which may be got in a ſolid form in the ſame manner as the neutral ſalts.

214 Cryſtallization.

13. The evaporating the purified expreſſed juices of certain vegetable ſubſtances to the conſiſtence of a cream, and then ſetting them by for months, in a cool place, to allow the eſſential acid ſalts to concrete into cryſtals. See CRYSTALLIZATION.

14. The diſtilling in proper veſſels vitriol or other ſubſtances which contain the ſulphuric acid, in order to get it ſeparate from them; and the burning of ſulphur mixed with a ſmall portion of nitre, under particular veſſels, ſo contrived, and ſo placed, as to collect the ſame acid.

15. The diſtilling nitre, or ſea ſalt, mixt with a certain portion of the ſulphuric acid, in order to obtain pure the nitric or muriatic acid.

215 Sublimation.

16. The ſubliming certain ſubſtances that become volatile by the application of heat, into proper veſſels; and either to unite two of them together for the formation of a third, as is done in the preparation of the corroſive ſublimate of mercury, when the muriatic acid is united to the quickſilver, or to ſeparate the volatile parts of any ſubſtance from the fixt, as is done in the ſublimation of volatile alkaline ſalts and of the acid of benjamin.

216 Melting

17. The melting by the force of fire ſuch ſubſtances as become fluid by the application of heat, ſo that they may be ſeparated from or united to other bodies. Thus by

[illegible] and the addition of certain [illegible] from them. And wax and some reſins are [illegible] united to each other; or they are diſſolved in fixed oils, for the preparation of plaſters, ointments, liniments, &c. And ſulphur is united to quickſilver for the making of a black or red ſulphuret.

217 Oxidation. 18. The applying of heat to metals, either to oxidate them, or to ſeparate certain volatile ſubſtances with which they are combined, or to purify them from more oxidable metals with which they are alloyed. Thus mercury is reduced to a red oxide merely by the continued application of heat and air; the ſulphuret of antimony is deprived of its ſulphur by roaſting, and ſilver is ſeparated from lead by being expoſed to ſuch a heat, as, while it only fuſes the ſilver, reduces the lead to an oxide. See CHEMISTRY.

218 alting.

CHAP. II. *Of the principal forms in which Medicines are exhibited.*

219 icinal ms. THE principal officinal preparations of the ſimple medicines, for the making of which directions are given in the Pharmacopœias, conſiſt of *powders*, *pills*, *troches*, *electuaries*, *inſpiſſated juices*, *extracts*, *infuſions*, *decoctions*, *mucilages*, *emulſions and mixtures*, *ſyrups*, *tinctures*, *wines*, for internal exhibition; and *cataplaſms*, *liniments*, *ointments*, *cerates*, *and plaſters*, for external application.

220 wder. The form of *powder* is one of the moſt ſimple, and very convenient for the exhibition of a variety of medicines. It is of courſe adapted only to ſuch ſubſtances as are eaſily reduced to powder, and ſuch as are not too bulky to be taken in a moderate doſe. Hence emollient and mucilaginous herbs and roots are improperly ordered in the ſtate of powder, as they are too bulky; alkaline ſalts, whether fixed or volatile, are improper, as they in general either deliqueſce in the air, or evaporate. Such articles as are of a very diſagreeable taſte, or offenſive odour, are alſo more conveniently given in ſome other form.

In preparing compound powders, care ſhould be taken that the ſeveral ingredients ſhould be intimately mixed together. Some of them may in general be moſt properly powdered ſeparately, but it is often of advantage to powder them together. They ſhould be kept in a cloſely ſtopped phial, and ſuch as are apt to loſe part of their virtue by long keeping, ſhould be prepared in ſmall quantities.

The doſe of powders ſhould be ſo regulated as ſeldom to exceed a dram. The ſubſtance in which they are to be taken ſhould be of ſuch a nature as to mix properly with them, ſo that they neither float at the top, nor ſink too rapidly to the bottom of the veſſel.

221 The form of *pill* is moſt convenient for ſuch articles as do not require to be given in a large doſe, and are ſo unpleaſant in taſte or ſmell, that they cannot be conveniently given in the form of powder. As many patients can ſwallow pills, who cannot take medicines in a leſs ſolid form, thoſe ſubſtances which are uſually ordered in powder, are not unfrequently formed into pills, when their bulk is not ſo great as to render the pills too numerous for a ſingle doſe.

The moſt uſual ſubſtances that enter into the compoſition of pills are reſins, gum-reſins, extracts, and ſolid medicines. Deliqueſcent [illegible] improper except in ſmall quantity, and then they ſhould be combined with ſame gummy powder. Such ſalts as [illegible] ſhould be previouſly expoſed to the air, ſo as to fall into powder. The liquid ſubſtances employed to form the [illegible] maſs, muſt be varied according to the nature of the more ſolid ingredients. Powders require ſyrup, mucilage, balſams, ſoap, conſerve, or honey. Gum reſins and extracts are [illegible] without any addition: but when this is required, a little [illegible] wine is the moſt proper. Where the maſs is to be compoſed of a mixture of gum-reſins and powders, the former ſhould be firſt moiſtened with the preſcribed liquid, then the powders added, and the whole beaten well together, till they are reduced into a uniform plaſtic maſs.

Pharmacy.

A dram of the pilular maſs is generally divided into about twelve pills, ſo that each pill may weigh about five grains.

The maſſes for pills ſhould be kept in bladders, and theſe ſhould be moiſtened now and then, either with a little wine, or with ſome of the ſame liquid that was employed in forming the maſs.

222 Troches. Troches or lozenges are hard, round, flat cakes, formed of ſuch ſubſtances as are intended to be gradually diſſolved in the mouth, and thus paſs by degrees into the ſtomach, or in their paſſage thither act on the throat or larynx. They ſhould be formed of ſuch ſubſtances as are ſoluble in the ſaliva, and are not of a diſagreeable taſte. They uſually contain a great deal of ſugar, and ſome gummy matter to render them coherent.

223 Electuaries. Electuaries are leſs ſolid than pills, being of ſuch a conſiſtence that they may be rolled up into a bolus, ſo as to be eaſily ſwallowed. They are chiefly compoſed of powders mixed up with ſyrup or honey. The ſubſtances that enter into the compoſition of electuaries are chiefly the milder alterative medicines, or gentle laxatives. The ſtronger cathartics, emetics, and ſuch ſubſtances as are of an unpleaſant taſte, ſuch as bitters, the fetid gum-reſins, and very heavy powders, are improper. The liquid employed to form electuaries is uſually ſyrup or honey, the proportion of which is regulated by the nature of the more ſolid ingredients, but is uſually of nearly equal weight.

224 Confections. Confections are now conſidered as ſynonimous with electuaries, as they differ from ordinary electuaries in nothing but being compoſed of more aromatic ingredients.

225 Conſerves. Conſerves may be conſidered as electuaries formed of only two ingredients, one of which is ſugar, and the other the pulp of ſome fruit, the petals of flowers, or the outer rind of Seville oranges.

226 Extracts and reſins. Extracts and reſins are pharmaceutical preparations, the rationale of which is very little underſtood. Dr Andrew Duncan Junr. has given an excellent account of them, which we ſhall here copy.

"Extract in pharmacy has long been uſed, in the common and true acceptation of the term, to expreſs a thing extracted, and therefore it was applied to ſubſtances of all kinds which were extracted from heterogeneous bodies, by the action of any menſtruum, and again reduced to a conſiſtent form, by the evaporation of that menſtruum. Lately, however, extract has been uſed in a different and much more limited ſenſe, as the name for a peculiar principle, which is often indeed contained in extracts, and which before had no proper appellation. It is in the former ſenſe that we employ it here, and in which we wiſh it to be only uſed, while a new word ſhould be invented as the name of the new ſubſtance. Till a better be propoſed, we ſhall call it *extractive*.

" Extracts are of various kinds, according to the nature of the ſubſtances from which they are obtained, and the menſtruum employed; but they commonly conſiſt of gum, ſugar, extractive tannin, cinchonin, gallic acid, or reſin, or ſeveral of them mixed in various proportions. The menſtrua moſt commonly employed are water and alcohol. The former is capable of extracting all the ſubſtances enumerated, except the reſin, and the latter all except the gum. Wine is alſo ſometimes employed, but very improperly; for as a ſolvent it can only act as a mixture of alcohol and water, and the principles which it leaves behind on evaporation are rather injurious than of advantage to the extract.

" Water is the menſtruum moſt commonly employed in making extracts, as it is capable of diſſolving all the active principles except reſin, and can have its ſolvent powers aſſiſted by a conſiderable degree of heat.

" Watery extracts are prepared by boiling the ſubject in water, and evaporating the ſtrained decoction to a thick conſiſtence.

" It is indifferent with regard to the medicine, whether the ſubject be uſed freſh or dry; ſince nothing that can be preſerved in this proceſs will be loſt by drying. With regard to the facility of extraction, however, there is a very conſiderable difference; vegetables in general giving out their virtues more readily when moderately dried than when freſh.

" Very compact dry ſubſtances ſhould be reduced into exceedingly ſmall parts, previous to the affuſion of the menſtruum.

" The quantity of water ought to be no greater than is neceſſary for extracting the virtues of the ſubject. This point, however, is not very eaſily aſcertained; for although ſome of the common principles of extracts be ſoluble in a very ſmall proportion of water, there are others, ſuch as tannin, of which water can diſſolve only a ſmall proportion, and cannot be made to take up more by any length of boiling; beſides we have no very good method of knowing when we have uſed a ſufficient quantity of water; for vegetable ſubſtances will continue to colour deeply ſucceſſive portions of water boiled with them, long after they are yielding nothing to it but colouring matter. Perhaps one of the beſt methods is to boil the ſubject in ſucceſſive quantities of water, as long as the decoctions form a conſiderable precipitate with the teſt which is proper for detecting the ſubſtance we are extracting, ſuch as a ſolution of gelatin for tannin, of alum for extractive, &c.

The decoctions are to be depurated by colature, and afterwards ſuffered to ſtand for a day or two, when a conſiderable quantity of ſediment is uſually found at the bottom. If the liquor poured off clear be boiled down a little, and afterwards ſuffered to cool again, it will depoſit a freſh ſediment, from which it may be decanted before you proceed to finiſh the evaporation. The decoctions of very reſinous ſubſtances do not require this treatment, and are rather injured by it, the reſin ſubſiding along with the active dregs.

" We would adviſe the decoctions to be evaporated after they have been filtered boiling hot, without any further depuration; becauſe ſome of the moſt active principles of vegetable ſubſtances, ſuch as tannin, are much more ſoluble in boiling than in cold water, and becauſe almoſt all of them are very quickly affected by expoſure to the atmoſphere. Therefore, if a boiling decoction, ſaturated with tannin, be allowed to cool, the greateſt part of the very principle on which the activity of the ſubſtance depends will ſeparate to the bottom, and according to the above directions, will be thrown away as ſediment. The ſame objection applies more ſtrongly to allowing the decoction to cool, and depoſite freſh ſediment, after it has been partially evaporated. Beſides, by allowing the decoctions to ſtand ſeveral days before we proceed to their evaporation, we are in fact allowing the active principles contained in the decoction to be altered by the action of the air, and to be converted into ſubſtances, perhaps inactive, which alſo are thrown away as ſediment.

" The evaporation is moſt conveniently performed in broad ſhallow veſſels; the larger the ſurface of the liquor, the ſooner will the aqueous parts exhale. This effect may likewiſe be promoted by agitation.

" When the matter begins to grow thick, great care is neceſſary to prevent its burning. This accident, almoſt unavoidable if the quantity be large, and the fire applied as uſual under the evaporating baſon, may be effectually prevented, by carrying on the inſpiſſation, after the common manner, no further than to the conſiſtence of a ſyrup, when the matter is to be poured into ſhallow tin or earthen pans, and placed in an oven, with its door open, moderately heated; which acting uniformly on every part of the liquid, will ſoon reduce it to any conſiſtence required. This may likewiſe be done, and more ſecurely, by ſetting the evaporating veſſel in boiling water; but the evaporation is in this way very tedious.

" Alcohol is by far too expenſive to be employed as a menſtruum for obtaining extracts, except in thoſe caſes where water is totally inadequate to the purpoſe. Theſe caſes are,

" 1. When the nature of the extract is very periſhable when diſſolved in water, ſo that it is liable to be decompoſed before the evaporation can be completed, eſpecially if we cannot proceed immediately to the evaporation.

" 2. When water is totally incapable of diſſolving the ſubſtance to be extracted, and

" 3. When the ſubſtance extracted can bear the heat of boiling alcohol without being evaporated, but would be diſſipated by that of boiling water; that is, when it requires a heat greater than 176°, and leſs than 212°, for its evaporization.

" In the laſt caſe, the alcohol muſt be perfectly free from water, becauſe the heat neceſſary to evaporate it at the end of the proceſs would fruſtrate the whole operation. Hence, alſo, the ſubject itſelf ought always to be dry; thoſe ſubſtances which loſe their virtue by drying, loſe it equally on being ſubmitted to this treatment with the pureſt alcohol.

" In this way the alcoholic extract of ſome aromatic ſubſtances ciples of rmacy.

ſubſtances, as cinnamon, lavender, roſemary, retain a conſiderable degree of their fine flavour.

"In the ſecond caſe, the alcohol need not be ſo very ſtrong, becauſe it is ſtill capable of diſſolving reſinous ſubſtances, although diluted with a conſiderable proportion of water.

"In the firſt caſe, the alcohol may be ſtill much weaker, or rather, the addition of a ſmall proportion of alcohol to water will be ſufficient to retard or prevent the decompoſition of the decoction.

"The alcohol employed in all theſe caſes ſhould be perfectly free from any unpleaſant flavour, leſt it be communicated to the extract.

"The inſpiſſation ſhould be performed, from the beginning, in the gentle heat of a water-bath. We need not ſuffer the alcohol to evaporate in the air; the greateſt part of it may be recovered by collecting the vapour in common diſtilling veſſels. If the diſtilled ſpirit be found to have brought over any flavour from the ſubject, it may be advantageouſly reſerved for the ſame purpoſes again.

"When diluted alcohol is employed, the diſtillation ſhould only be continued as long as alcohol comes over; and the evaporation ſhould be finiſhed in wide open veſſels.

"Pure reſins are prepared, by adding to ſpirituous tinctures of reſinous vegetables, a large quantity of water. The reſin, incapable of remaining diſſolved in the watery liquor, ſeparates and falls to the bottom; leaving in the menſtruum ſuch other principles of the plant as the ſpirit might have extracted at firſt along with it. But this is only practiſed for the purpoſe of analyſis *."

Of infuſions and decoctions it is unneceſſary for us to make any farther remarks, after what was obſerved in N° 200 and 201.

227 ucilages.

Mucilages are ſolutions of the pure gums, or of ſimilar ſubſtances, in water. They ſhould not be made too thin, as they are then more readily decompoſed on expoſure to the air.

228 ixtures d emul- ns.

Mixtures are liquid preparations compoſed of ſubſtances that are not ſoluble in water, as various powders, barks, roots, &c. Emulſions differ from mixtures in being compoſed of oily or reſinous ingredients, ſuſpended in water by means of yolk of egg, honey, or mucilage. Both theſe preparations ſhould be made as they are required, as few of them keep well.

229 rups.

Syrups are ſolutions of ſugar, either in plain water, in the juice of ſome fruit, or in ſome vegetable infuſion or decoction. They are employed chiefly to render mixtures or other liquid medicines more palatable, or to mix up powders and other ſolid ingredients into pills, electuaries, or troches. The proportion of ſugar employed in the making of ſyrups ſhould be ſo regulated as to preſerve the ſyrup in the ſame ſtate as when firſt made. If too little ſugar has been employed, the ſyrup will ſuffer decompoſition, and ferment; if too much, part of the ſugar will ſeparate in cryſtals, leaving the remainder too weak.

230 nctures.

Formerly the term tincture was employed to denote any tranſparent ſolution, whether in water or ſpirit, that was coloured. At preſent it is commonly applied to ſolutions made by digeſtion in alcohol, or in proof ſpirit, though it is frequently extended to ſolutions in ether, or in ammoniated alcohol. For the action of alcohol as a menſtruum, ſee CHEMISTRY.

Principles of Pharmacy.

In making alcoholic tinctures, we muſt obſerve that the virtues of recent vegetable matters are very imperfectly extracted by ſpirituous menſtrua. They muſt therefore be previouſly carefully dried, and as we cannot aſſiſt the ſolution by means of heat, we muſt facilitate it by reducing the ſolvend to a ſtate of as minute mechanical diviſion as poſſible. To prevent loſs, the ſolution is commonly made in a cloſe veſſel, and the heat applied muſt be very gentle, leſt it be broken by the expanſion of vapour.

The action of tinctures on the living ſyſtem is always compounded of the action of the menſtruum, and of the matters diſſolved in it. Now, theſe actions may either coincide with, or oppoſe each other; and as alcohol is at all times a powerful agent, it is evident that no ſubſtance ſhould be exhibited in the form of a tincture, whoſe action is different from that of alcohol, unleſs it be capable of operating in ſo ſmall a doſe, that the quantity of alcohol taken along with it is inconſiderable.

Tinctures are not liable to ſpoil, as it is called, but they muſt neverthele*ſ*s be kept in well cloſed phials, eſpecially when they contain active ingredients, to prevent the evaporation of the menſtruum.

They generally operate in doſes ſo ſmall, that they are rarely exhibited by themſelves, but commonly combined with ſome vehicle. In chooſing the latter, we muſt ſelect ſome ſubſtance which does not decompoſe the tincture, or at leaſt ſeparate nothing from it in a palatable form.

The London college directs all tinctures, except that of muriate of iron, to be prepared in cloſe phials.

The Dublin college explain, that when any other ſubſtances are to be digeſted, they mean it to be done with a low degree of heat; and when they are to be *macerated*, it is to be done with a degree of heat between 60° and 90°. *

Medicated wines and medicated vinegars differ from tinctures in nothing but the menſtruum.

231 Cataplaſms.

Of the external applications, the preparations of which are given in the Pharmacopœias, cataplaſms or poultices may be conſidered as extemporaneous, being never kept ready made.

232 Liniments, ointments, and cerates.

Liniments, ointments, and cerates, are compoſitions of fatty matters, either animal or vegetable, or both, employed as external emollients. They differ only in conſiſtence, liniments being very ſoft, or nearly fluid; ointments ſufficiently hard not to melt in the ordinary temperature of the atmoſphere; and cerates being of ſuch a conſiſtence as to be readily ſpread on cloth, &c. without the aſſiſtance of heat. Theſe laſt commonly contain a conſiderable proportion of wax, whence their name.

233 Plaſters.

Plaſters are more ſolid than cerates, and uſually require the aid of heat to ſpread them on the proper ſubſtance for application, which is uſually leather. Plaſters ſometimes contain powders in their compoſition, and in preparing theſe it is proper firſt to melt the fatty ingredients, and ſprinkle in the powder when the melted matter is beginning to cool.

PART IV

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* *Duncan's ew Diſ- nſatory*, ap. xxxiv.

* *Duncan's Diſpenſatory*, chap. xxx.

PART IV. A BRIEF ACCOUNT OF THE ARTICLES OF THE MATERIA MEDICA, WITH THEIR OFFICINAL PREPARATIONS.

Chap. I. *Animal Subſtances.*

234 Phoſphorus.

1. Phosphorus, ſee Chemistry *Index.*

Some daring practitioners have lately ventured to recommend the *internal* uſe of this active inflammable in the advanced ſtage of typhus, in palſy and other caſes of great debility. Taken into the ſtomach in a moderate quantity (below a grain) it produces heat in that organ, accelerates the pulſe, promotes perſpiration, and is ſaid to give unuſual vigour to the body. In larger quantity it produces inflammation of the ſtomach and bowels, followed by gangrene and death. Doſe one-eighth to one-fourth of a grain in ether, or incorporated with mucilage.

The *internal* uſe of this ſubſtance appears to us to be more than *doubtful*; but we think we have experienced ſome benefit from it externally, when diſſolved in oil, in paralytic and rheumatic caſes.

235 Muriate of ammonia.

2. Murias Ammoniæ, E. SAL AMMONIACUS, L. D. Muriate of ammonia. *Sal ammoniac* (D).

The pureſt muriate of ammonia of commerce is that prepared by ſublimation, and which is formed of large convexo-concave cakes, firm and elaſtic, not eaſily broken, and difficult to be cut. It is of a yellowiſh white colour, of little ſmell, and of a very ſharp ſaline taſte.

It is found native in the neighbourhood of volcanoes; but is uſually prepared for medical purpoſes either from the dung of animals that feed on ſalt marſhes; or by decompoſing ſulphate of ammonia by muriate of ſoda, or by immediately combining ammonia with muriatic acid.

Internally it is ſometimes given as a ſtimulant in typhus fevers in doſes of 20 or 30 grains mixed with camphorated mixture; but it is principally employed externally in lotions and embrocations, either as a refrigerant to cool the ſurface in ſprains and inflammations, or as a ſtimulant to diſperſe tumors or morbid accumulations of fluids, or to quicken the circulation, as in chillblains, &c.

Officinal Preparations.

236 Water of ammonia.

a. Aqua Ammoniæ, E. AQUA AMMONIÆ PURÆ, L. LIQUOR ALKALI VOLATILIS CAUSTICUS. D. Water of ammonia. *Water of pure ammonia. Cauſtic ſolution of volatile alkali. Strong ſpirit of ſal ammoniac.*

This is prepared by decompoſing muriate of ammonia by means of quicklime with the addition of water, and afterwards diſtilling off the ſtrongeſt portion with a gentle heat. The preparations of the different colleges vary a little, the Edinburgh Pharmacopœia ordering one pound of muriate of ammonia to one pound and a half of quicklime; the London one pound to two pounds; and the Dublin 16 ounces to two pounds. No great quantity of water is neceſſary. The lime is firſt ſlaked with part of the water, and after it is cold, the ſalt and reſt of the water are added, and the diſtillation carried on in well-cloſed veſſels. The Edinburgh college directs Woolf's apparatus to be employed as a receiver, and orders all the ſeparate liquors to be mixed together.

The *ſolution of ammonia* ſhould be perfectly limpid and tranſparent, ſhould have an extremely pungent odour, ſhould not effervesce with acids, and ſhould produce no precipitate on the addition of alcohol or lime water. It ſhould be kept in ſmall bottles well ſtopt with ground ſtoppers, and ſhould ſtand in a very cool place.

This preparation is a very powerful ſtimulant, irritating and inflaming the ſkin and noſtrils, when applied externally or ſnuffed up the noſe. Hence its uſe as a rubefacient in rheumatiſm, cynanche, paralyſis, and as a general ſtimulus in ſyncope, hyſteria, &c. It is ſcarcely uſed internally. See below.

237 Ammoniated alcohol.

b. Alcohol ammoniatum, E. SPIRITUS AMMONIÆ, L. SPIRITUS ALKALI VOLATILIS, D. Ammoniated alcohol. *Spirit of ammonia. Spirit of volatile alkali.*

This as prepared by the Edinburgh Pharmacopœia is merely a ſolution of ammonia in alcohol, and is prepared by decompoſing eight ounces of muriate of ammonia by 12 ounces of quicklime, with the addition of eight ounces of water and 32 ounces of alcohol, and diſtilling off the alcohol. The preparation of the London and Dublin colleges is made by mixing four ounces of muriate with ſix ounces of potaſhes and three pints of alcohol. The latter therefore contains much *carbonate of ammonia*, and is not ſo ſtrong as the former.

238 Carbonate of ammonia.

c. Carbonas Ammoniæ, E. AMMONIA PREPARATA, L. ALKALI VOLATILE MITE, D. Carbonate of ammonia. *Prepared ammonia. Mild volatile alkali.*

This is prepared by mixing together one pound of muriate of ammonia, and twelve pounds of pure carbonate of lime or chalk, after being reduced to powder ſeparately, and afterwards ſubliming.

This preparation, as it occurs in the ſhops, is compoſed of irregular maſſes of a very white, nearly opaque ſalt, of a ſtrong pungent odour, and ſharp alkaline taſte. It requires to be kept cloſely ſtopped from the air, by the action of which it crumbles into powder, and its volatile part is diſſipated. When pure, it ſhould be entirely volatilizable by heat, but if any thing remains

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(D) The letters E. L. D. affixed to the articles in this part denote that they are articles of the Edinburgh, London, or Dublin Pharmacopœias.

[illegible] mains, there is reaſon to ſuppoſe that carbonate of potaſh or of lime is mixed with it; and theſe impurities are moſt likely to be preſent if it is purchaſed in the form of a powder.

Carbonate of ammonia in its medical properties reſembles the ſolution of ammonia, but it is not ſo ſtrong. It is chiefly employed for ſmelling bottles, which are uſed in caſes of hyſteria or ſyncope, and is often formed into a neutral ſalt with the juice of lemons, (*citrate of ammonia*) and given as a gentle diaphoretic. It is ſometimes given alone, or mixed with aromatics, in the form of a bolus, as a diaphoretic or ſtimulant. Doſe five to ten grains.

239 Water of carbonate of ammonia.

d. AQUA CARBONATIS AMMONIÆ, E. AQUA AMMONIÆ, L. LIQUOR ALKALI VOLATILIS MITIS, D. Water of carbonate of ammonia. *Liquor of mild volatile alkali.*

This is merely a ſolution of carbonate of ammonia in water, and might be properly prepared by diſſolving a certain proportion of that ſalt in diſtilled water. The colleges of Edinburgh and Dublin direct it to be made by mixing together 16 ounces of muriate of ammonia, and the ſame quantity of carbonate of potaſh, pouring upon them two pounds of water, and diſtilling to dryneſs. In the London Pharmacopœia, the proportions are one pound of the muriate, a pound and a half of potaſhes, and four pints of water, drawing off two pints by diſtillation with a ſlow fire.

This ſolution ſhould be tranſparent and colourleſs; ſhould produce a ſtrong coagulum on the addition of alcohol, and ſhould effervesce with acids.

It is often employed in medicine, both internally and externally. Internally it is given, firſt as an emetic, in a doſe of from 1 to 2 drams: ſecondly, as a diaphoretic; doſe about 50 drops: thirdly, as a ſtimulant, 20 drops to a dram: fourthly as an antiſpaſmodic, in a ſimilar doſe: fifthly, as an antacid: and ſixthly, as an anthelmintic combined with oil into an emulſion.

240 Water of acetate of ammonia.

e. AQUA ACETITIS AMMONIÆ, E. AQUA AMMONIÆ ACETATÆ, L. LIQUOR ALKALI VOLATILIS ACETATI, D. SPIRITUS MINDERERI. Water of acetite of ammonia. *Water of acetated ammonia. Liquor of acetated volatile alkali. Mindererus's ſpirit.*

This is a ſecondary ſalt, formed by neutralizing carbonate of ammonia with diſtilled acetous acid.

It forms a tolerably tranſparent ſolution, commonly of a greeniſh caſt, of little ſmell, and of a weak ſaline taſte. It ſhould ſhew no ſigns of effervescence on the addition of either acetous acid or carbonate of ammonia.

This medicine acts as a gentle diaphoretic, of conſiderable uſe in low fevers, and ſeveral inflammatory complaints. It may be given in a doſe of 3—6 drams in the form of a draught or julep. It ſhould be aſſiſted by warm clothing, and warm diluent liquors.

241 Hydroſulphuret of ammonia.

f. HYDROSULHURETUM AMMONIÆ, E. Hydroſulphuret of ammonia.

This preparation has been newly introduced into medical practice, by the Edinburgh college, who direct it to be prepared by ſubjecting 4 ounces of water of ammonia to a ſtream of gas ariſing from a [illegible] ounces of ſulphuret of iron, and 8 ounces of muriatic acid, previouſly diluted with 24 ounces of water.

This preparation forms a ſolution of a dark green colour and a very fetid odour. It ſhould more properly be called ſulphureted hydrogenet of ammonia. It acts powerfully on the living ſyſtem. It induces vertigo, drowſineſs, nauſea, and vomiting, and leſſens the action of the heart and arteries. It therefore ſeems to be a direct ſedative. According to the doctrine of the chemical phyſiologiſts, it is a powerful diſoxygenizing remedy. It has only been uſed in diabetes by Dr Rollo and others, under the name of hepatized ammonia, in doſes of five or ten drops twice or thrice a day *.

242 Ammoniated oil.

g. OLEUM AMMONIATUM, E. LINIMENTUM AMMONIÆ, L. D. LINIMENTUM VOLATILE. Ammoniated oil. *Liniment of ammonia. Volatile liniment.*

Ammoniated oil is properly a ſoap, formed by combining a ſolution of ammonia, or of carbonate of ammonia, with olive oil. The Edinburgh college directs it to be prepared by mixing together two ounces of olive oil and two drams of water of ammonia. The London college has two preparations of this kind; a ſtronger, formed of one ounce of water of pure ammonia, mixed with two ounces of olive oil; and a weaker, of half an ounce of water of ammonia and one ounce and a half of oil.

This preparation is ſeldom kept ready made, as by ſtanding it becomes thick, and is diminiſhed in ſtrength. It is of a light yellow colour.

Ammoniated oil is a uſeful external application in caſes of cynanche and rheumatiſm, being either rubbed on the affected part, or applied to it ſpread on flannel, and changed occaſionally.

243 Aromatic ammoniated alcohol.

h. ALCOHOL AMMONIATUM AROMATICUM, E. SPIRITUS AMMONIÆ COMPOSITUS, L. SPIRITUS ALKALI VOLATILIS AROMATICUS, D. Aromatic ammoniated alcohol. *Compound ſpirit of ammonia. Aromatic ſpirit of volatile alkali. Sal volatile.*

This is a compoſition of *ammoniated alcohol* with various aromatic oils. In the Edinburgh Pharmacopœia it is prepared by diſſolving one dram and a half of oil of roſemary, and one dram of oil of lemon peel, in eight ounces of ammoniated alcohol: by the London college we are directed to prepare it of two pints of ſpirit of ammonia, and two drams of oil of lemon, and of oil of cloves; and by that of Dublin, of two pounds of ſpirit, and of oil of lemon and oil of nutmeg, each two drams.

It is of a light amber colour, and of a very fragrant ſmell. It is more palatable and leſs acrimonious than the other preparations of ammonia, and is well ſuited to ſpaſmodic complaints, faintneſs, and weakneſs of the ſtomach. Doſe from twenty drops to a dram.

244 Volatile liniment.

i. LINIMENTUM VOLATILE, D. Volatile Liniment of the Dublin college.

A compoſition of one part of the above preparation and two parts of the Dublin ſoap liniment, of which hereafter. A ſtimulating external application.

245 Succinated ſpirit of ammonia.

k. SPIRITUS AMMONIÆ SUCCINATUS, L. Succinated ſpirit of ammonia.

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* Duncan's Diſpenſatory.

This is prepared by diſſolving a ſcruple of rectified oil of amber, and ten grains of ſoap in an ounce weight of alcohol, and then adding four meaſured ounces of water of pure ammonia.

It is at firſt of a milky colour, but gradually becomes more or leſs tranſparent by ſtanding. It is conſidered as much the ſame with the French *eau de luce*.

It is an uſeful antiſpaſmodic, whether ſnuffed up the noſe or rubbed on the temples.

246 Fetid ammoniated alcohol.

l. ALCOHOL AMMONIATUM FOETIDUM, E. SPIRITUS AMMONIÆ FŒTIDUS, L. SPIRITUS ALKALI VOLATILIS FŒTIDUS, D. Fetid ammoniated alcohol. *Fetid ſpirit of volatile alkali.*

A ſolution of aſafœtida in ſpirit of ammonia, which is prepared according to the Edinburgh college by digeſting half an ounce of aſafœtida in eight ounces of ſpirit of ammonia for 12 hours, and diſtilling off the ſpirit. The London college directs ſix pints of proof ſpirits, a pound of ſal ammoniac, four ounces of aſafœtida, and a pound and half of potaſh, to be mixed together, and five pints to be diſtilled off with a ſlow fire.

An excellent antiſpaſmodic, particularly ſuited to hyſterical caſes. Doſe from 30 drops to a dram.

Particular Animal Subſtances.

CLASS MAMMALIA. Order GLIRES.

3. CASTOR FIBER, E. The Beaver. CASTOREUM, L. D. *Caſtor.*

247 Caſtor.

This is a ſubſtance ſecreted in a follicle ſituated near the anus of the beaver, perhaps the inguinal gland. It is of a dark brown colour, friable, of a pungent bitter taſte, and a very ſtrong unpleaſant ſmell. It is contained in a roundiſh or flattened membranous bag. Bouillon la Grange has found by analyſis, that it conſiſts of mucilage, bitter extract, reſin, a peculiar volatile oil, and a flaky cryſtalline ſubſtance reſembling *adipocire*. Its volatile parts come over by diſtillation with water, and great part of the ſubſtance is ſoluble in alcohol.

The beſt caſtor comes from Ruſſia, but a great deal is brought from Canada. The Ruſſian caſtor is in larger, rounder bags, and is of a much ſtronger ſmell than the Canadian.

Caſtor is one of our moſt eſtabliſhed antiſpaſmodics, and was much eſteemed and extolled by Dr Cullen. It is chiefly preſcribed in hyſteria, but ſeldom alone or in ſubſtance. Doſe from 10 to 30 grains in a bolus.

Officinal Preparations.

a. TINCTURA CASTOREI. Tincture of Caſtor.

248 Tincture of caſtor.

The London and Dublin colleges direct two ounces of powdered Ruſſian caſtor to be digeſted ten or ſeven days in two pints (London), or two pounds (Dublin), of proof ſpirit. According to the Edinburgh formula, an ounce and half of Ruſſian caſtor is to be digeſted for ſeven days in a pound of alcohol, and the tincture ſtrained through paper.

This tincture is of a dark brown colour, and poſſeſſes all the valuable properties of the ſimple drug. Doſe from 30 drops to a dram. It is ſometimes uſed as an external application in ear-ach; equal parts of this and tincture of opium being dropped into the ear.

b. TINCTURA CASTOREI COMPOSITA, E. Compound tincture of caſtor.

249 Compound tincture of caſtor.

This is prepared by digeſting an ounce of powdered Ruſſian caſtor, and half an ounce of aſafœtida, in a pound of ammoniated alcohol for ſeven days, filtering the liquor through paper.

A more powerful antiſpaſmodic than the former; doſe from 20 to 40 drops.

250 Muſk.

4. MOSCHUS MOSCHIFERUS, E. The muſk animal. MOSCHUS, L. D. Muſk.

Muſk is a reſinous matter ſecreted in a receptacle ſituated near the navel of the muſk animal. See MAMMALIA *Index*.

This ſubſtance is, when dry, of a reddiſh brown or ruſty black colour, ſomewhat unctuous, and of a more or leſs granulated appearance: it has a bitteriſh and rather acrid taſte; a fragrant ſmell, agreeable at a diſtance, but ſo ſtrong as to be highly unpleaſant when ſmelt near to. So violent indeed is the ſmell of muſk, when freſh taken from the animal, or from quantities put up by the merchants for ſale, that it has been known to force the blood from the noſe, eyes, and ears, of thoſe who have imprudently inhaled its vapours; and we are aſſured by Chardin, that whenever he engaged in the purchaſe of muſk, he found it always neceſſary to cover his face with ſeveral folds of a handkerchief, in order to be ſufficiently ſecure againſt the ſudden effects of the ſmell.

As muſk is an expenſive drug, it is frequently adulterated by various ſubſtances; and we are aſſured that pieces of lead have been found in ſome of the receptacles, inſerted in order to increaſe the weight. The moſt uſual mode of adulterating it is by taking the muſk from the bag, and mixing it with dried blood coarſely powdered. This may in general be detected by obſerving that the bag has been opened; by the fetid ſmell which the ſubſtance emits when heated, and by the ſmell of amomoniacal gas which is perceived when the adulterated muſk is rubbed with potaſh.

This ſubſtance is particularly efficacious, and there is ſcarcely any ſubſtitute for it in particular caſes. When properly adminiſtered it ſometimes ſucceeds in the moſt deſperate caſes. It raiſes the pulſe without producing much heat; it removes ſpaſmodic affections, and is found to have conſiderable effect on the nervous ſyſtem, increaſing the powers of thought, ſenſation, and voluntary motion.

It may be employed in all caſes of typhus fevers; in particular, where there is much delirium, ſubſultus tendinum, &c. It is alſo employed in febrile eruptions, and in many ſpaſmodic diſeaſes, as the chincough, epilepſy, tetanus, &c.

Officinal Preparations.

a. TINCTURA MOSCHÆ, D. Tincture of muſk.

251 Tinctu muſk.

This is prepared by macerating two drams of muſk in a pound of rectified ſpirit of wine for ſeven days, and ſtraining the liquor.

The tincture of muſk may be given in doſes of a dram or two. It is beſt mixed with honey or ſyrup, as the addition of water renders it turbid.

252 *b*. MISTURA MOSCHATA, L. Muſk mixture.

This is directed by the London college to be made by rubbing two ſcruples of muſk, firſt with one dram of double refined ſugar, then with the addition of the ſame quantity of powdered gum arabic, and ſix ounces of roſe water, added by degrees.

The muſk muſt be well rubbed with the ſugar and gum, before the roſe water be added, otherwiſe a ſeparation will take place. It is beſt to make this prepartion only when required, as it does not keep well.

Muſk mixture is given in moſt of the caſes in which the ſimple drug is indicated. Doſe, an ounce or an ounce and a half.

253 artſhorn. 5. CERVUS ELAPHUS, E. the Stag. CORNU CERVINUM, L. D. *Hartſhorn*.

The horn of the ſtag differs little from bone, except in containing more cartilage. It was formerly employed in the preparation of ammonia, whence that alkali was denominated *hartſhorn*, and at preſent there are two or three modifications of ammonia that are directed to be prepared from this ſubſtance. It is alſo burnt to form pure phoſphate of lime.

Officinal Preparations.

254 *a*. PHOSPHAS CALCIS, E. CORNU CERVI, VEL CERVINUM USTUM, L. D. Phoſphate of lime. *Burnt hartſhorn*.

The Edinburgh college directs this to be prepared by burning pieces of hartſhorn till they become perfectly white, and then reducing them to a fine powder.

Burnt hartſhorn was formerly given as an antacid; but its efficacy in that way appears to be trifling, as the phoſphoric acid is not eaſily ſeparated from the lime, and of courſe the latter will not neutraliſe the acid morbidly ſecreted in the alimentary canal. Of late pure phoſphate of lime has been recommended as a remedy for rickets, with the view of ſupplying ſolid matter to the bones. Doſe about ten grains.

255 *b*. LIQUOR VOLATILIS CORNU CERVI, L. D. Volatile liquor of hartſhorn. *Spirit of hartſhorn*.

256 *c*. SAL CORNU CERVI, L. D. *Salt of hartſhorn*.

257 *d*. OLEUM CORNU CERVI, L. D. *Oil of hartſhorn*.

Theſe are all made from one chemical operation. A quantity of hartſhorn is put into a retort, and ſubmitted to a heat that is gradually increaſed. Firſt the volatile liquor comes over, then the ſalt, and laſtly the oil. After the ſalt and oil are ſeparated from the liquor, this is diſtilled again two or three times with a moderate heat, by which it is rendered more pure.

The ſalt is purified by mixing it with an equal weight of prepared chalk, and then ſubliming.

The volatile liquor and ſalt of hartſhorn differ little from the water of carbonate of ammonia, and the ſolid carbonate, except in containing a quantity of empyreumatic oil. They are in fact leſs pure than the above mentioned preparations of ammonia, and might be entirely ſet aſide. They are chiefly uſed to ſmell to in caſes of fainting or hyſteria.

Theſe preparations may be made from the bones or horns of any animal, where hartſhorn cannot be conveniently procured.

258 *e*. OLEUM ANIMALE, L. OLEUM CORNU CERVINI RECTIFICATUM, D. Animal oil. *Rectified oil of hartſhorn. Dippel's oil.*

This is made by diſtilling the oil of hartſhorn that riſes in the preceding operation, twice or three times, either by itſelf, or with the addition of water.

Animal oil was formerly much employed as a powerful antiſpaſmodic. Doſe 15—30 drops. When given ſix hours before the acceſſion of a paroxyſm of an intermitting fever, on an empty ſtomach, it is ſaid to have kept off the paroxyſm.

6. OVIS ARIES, E. the Sheep. SEVUM OVILLUM, L. D. *Mutton ſuet*. 259 Mutton ſuet.

Mutton ſuet is employed in the preparation of ſeveral ointments and cerates, which will be mentioned hereafter.

Order 6. BELLUÆ.

7. SUS SCROFA, E. the Hog. ADEPS SUILLUS, L. D. *Hogs lard*. 260 Hogs lard.

Uſed alſo in the preparation of liniments, ointments, &c. and ſometimes employed alone as an external emollient.

Order 7. CETE.

8. PHYSETER MACROCEPHALUS, E. Spermaceti Whale. *Sperma Ceti*, L. D. 261 Spermaceti.

This is a white flakey ſubſtance, that is found in certain cells in the head of the ſpermaceti whale. See CETOLOGY, N° 66, and CHEMISTRY, N° 2860.

As an emollient, ſpermaceti is employed both internally and externally. Internally it is given in the form of emulſion mixed with mucilage or yolk of egg, or mixed with ſyrup into a linctus, in caſes of catarrh, *ardor urinæ*, &c. As an external application, it enters into the compoſition of the following

Officinal Preparations.

a. UNGUENTUM SPERMATIS CETI, L. D. Spermaceti ointment. 262 Ointment of ſpermaceti.

This ointment is prepared by melting together ſix drams of ſpermaceti, two drams of white wax, and three ounces of olive oil, over a ſlow fire, ſtirring them conſtantly till they are cold.

b. CERATUM SPERMATIS CETI, L. D. CERATUM SIMPLEX, E. Spermaceti cerate. *Simple Cerate. White Cerate.* 263 Spermaceti cerate.

In the preparations of this cerate, the proportions of the Edinburgh pharmacopæia differ from thoſe directed by the colleges of London and Dublin. The former orders ſix parts of olive oil, three of white wax, and one of ſpermaceti; the two latter, half an ounce of ſpermaceti, two ounces of white wax, and four ounces

Officinal Medicines.

[illegible]. They are made in a ſimilar manner with the ointment.

Theſe preparations are uſed principally for dreſſing ulcers, or to form more compounded ointments or cerates.

264 [illegible]

CLASS II. BIRDS. Order 2. ANSERES.

9. ANAS ANSER, the gooſe. ADEPS ANSERINUS, D. Gooſe greaſe.

This fat is now rarely uſed in medicine, as it ſeems to poſſeſs no ſuperior properties to hog's lard, which is more conveniently procured.

265 Egg.

Order GALLINÆ.

10. PHASIANUS GALLUS, the domeſtic fowl. OVUM EJUSQUE PUTAMEN. *Egg, and egg-ſhells.*

The yolk of egg is employed in pharmacy for rendering oils and reſins miſcible with water. For this purpoſe it is ſcarcely preferable to common vegetable mucilage, and has the diſadvantage of ſooner becoming putrid, and the white is uſed in making *alum cataplaſm*. Egg-ſhells prepared, i. e. levigated, are ſometimes employed as an antacid, but they do not ſeem better in that reſpect than common carbonate of lime, or magneſia.

266 [illegible]

CLASS IV. FISHES. Order 6. CHONDROPTERYGII.

11. ACCIPENSER HUSO, E. Iſinglaſs fiſh. ICHTHYOCOLLA, L. D. *Iſinglaſs.* See the article ICHTHYOCOLLA.

Employed as an emollient, and ſaid to be the principal ſubſtance uſed in making *court plaſter*.

267 [illegible]

CLASS V. INSECTS. Order 1. COLEOPTERA.

12. LYTTA VESICATORIA. MELOE VESICATORIUS, E. CANTHARIS, L. D. Cantharides. *Spaniſh flies.*

For the natural hiſtory of this inſect, ſee ENTOMOLOGY, p. 169; and for its chemical analyſis, ſee CHEMISTRY, N° 2875.

Cantharides are ſtimulant and virulent to ſo great a degree, that their internal exhibition requires to be conducted with the utmoſt caution, otherwiſe inflammation in the ſtomach, inteſtines, or urinary paſſages, may be the conſequence. When taken in conſiderable quantity, they produce inflammation and ulceration of the ſtomach and bowels, attended with mucous or purulent ſtools, fetid breath, violent pains in the belly: and theſe ſymptoms, if not timely relieved, are followed by faintneſs, giddineſs, and death. Applied externally, they inflame and excoriate the ſkin, and if continued for a ſufficient time, produce a large veſication filled with acrid ſerum. Their external application is not unfrequently followed by diſtreſſing ſtrangury.

Internally they have been exhibited as a diuretic in dropſical caſes, in a doſe from half a grain to a grain. They are frequently employed in weakneſs of the urinary organs: in incontinence of urine, proceeding from paralyſis veſicæ, in gleets, fluor albus, diabetes, and other diſeaſes of the urinary paſſages, originating in, or connected with debility. Not only in the incontinency of urine which accompanies a palſy of the lower extremities, but alſo in that which is occaſioned by an over-diſtenſion of the bladder, theſe flies have been adminiſtered internally with evident relief. The ſame beneficial effects have followed their uſe in iſchuria veſicalis, or ſuppreſſion of urine from over-diſtenſion of the bladder. They are recommended as an excellent remedy in gleets by *Mead* and *Werlhof*, and the laſt mentioned phyſician preſcribed them in caſes of hydrophobia.

Hiſtory of Simple and Officinal Medicines.

The internal uſe of cantharides in gleets and leucorrhœa has of late been much extended by Dr John Robertſon; but for an account of the circumſtances which led him to ſuch a free uſe of this medicine, and for his mode of exhibiting it, we muſt refer to his late work on the ſubject, and a paper publiſhed by him in the ſecond volume of the Edinburgh Medical Journal.

When theſe ſtimulants are adminiſtered internally, they are preſcribed either in powder or in tincture. The doſe in ſubſtance (which is the moſt certain form of internal exhibition) is from half a grain to one or two grains every ſixth hour, made into pills. Of the tincture, the doſe is from 10 to thirty drops. During the uſe of either, the patient ſhould be directed to drink of mucilaginous decoctions, emulſions, &c. Camphor is thought by ſome practitioners to moderate the too ſtimulating action of cantharides, and is accordingly combined with them or their tinctures whenever they are given internally. Others join nitre with them, as well as camphor.

Of the external uſe of cantharides by way of bliſter we ſhall ſpeak preſently under the preparations that are employed for that purpoſe.

Officinal Preparations.

268 Tincture of cantharides.

a. TINCTURA MELOES VESICATORII, E. TINCTURA CANTHARIDIS, L. T. CANTHARIDUM, D. Tincture of cantharides.

The Edinburgh tincture is directed to be made, by digeſting for ſeven days, a dram of powdered cantharides in a pound of diluted alcohol; and that of the Dublin college is prepared with the ſame proportions. The London tincture is made by digeſting two drams of bruiſed cantharides, and half a pound of powdered cochineal, in a pint and a half of proof ſpirit for eight days.

Theſe tinctures differ a little in point of ſtrength. When given internally, the doſe of the Edinburgh or Dublin tincture may be from 20 to 30 drops; that of the London tincture from 10 to 20 drops. They are employed externally as a *rubefacient* in caſes of palſy, angina, gaſtritis, &c.

269 Cerate of cantharides.

b. CERATUM CANTHARIDIS, L. D. Cerate of cantharides.

This cerate is prepared by mixing a dram, or four ſcruples, of powdered cantharides, with ſix drams, or an ounce, of ſpermaceti cerate.

It is chiefly employed to promote the running of iſſues.

270 Plaſter of cantharid

c. EMPLASTRUM MELOES VESICATORII, E. EMPLASTRUM CANTHARIDIS, L. EMP. CANTHARIDUM, D. Plaſter of cantharides. *Bliſtering plaſter.*

According to the Edinburgh college, this plaſter is to ttery of mple and fficinal edicines. to be prepared by firſt melting together equal weights of mutton ſuet, yellow wax, and white roſin; and when theſe are removed from the fire, ſprinkling in an equal proportion of powdered cantharides. The proportions of the London and Dublin colleges are 1 pound of finely powdered cantharides, 2 pounds of wax plaſter, and half a pound of hog's lard, and the ingredients are mixed in a ſimilar manner.

271 ompound aſter of ntharides. *d.* EMPLASTRUM MELOES VESICATORII COMPOSITUM, E. Compound plaſter of cantharides.

This is made of Burgundy pitch, Venice turpentine, cantharides; each 12 parts, yellow wax, 4 parts; ſubacetate of copper, 2 parts; muſtard ſeed and black pepper, each 1 part. Having firſt melted the pitch and wax, the turpentine is to be added, and while theſe ingredients are ſtill fluid, the other articles in fine powder are to be mixed with them, and the whole conſtantly ſtirred till cold.

This laſt-mentioned plaſter of Spaniſh flies is too compound, and being of a corroſive quality, is rarely preſcribed. The other more ſimple forms of cantharides plaſter are in frequent uſe for exciting veſications in various acute and chronic diſeaſes, particularly in internal inflammations and pains, as well as in many ſpaſmodic affections. Bliſtering has been recommended by ſome phyſicians in the advanced and ſinking ſtage of typhus fever; but the propriety of ſuch a practice is extremely queſtionable. We would further remark, that in the febrile diſorders of children, a good deal of caution is requiſite in the application of bliſters; a ſpreading erythematous inflammation, and even gangrene, being ſometimes the conſequence. In ſome of the above-mentioned diſorders much benefit is obtained by keeping the bliſtered part open, or in an ulcerated ſtate for a conſiderable length of time. This is done by any of the following ointments.

272 intment f cantha-des. *e.* UNGUENTUM CANTHARIDIS, L. UNG. CANTHARIDUM, D. Ointment of cantharides.

This is prepared by taking pulverized Spaniſh flies, two ounces; diſtilled water, eight ounces; ointment of yellow reſin, eight ounces. The Spaniſh flies being boiled in the water, this is reduced to half the original quantity, the liquor is ſtrained, and the ointment of yellow reſin added. The mixture is then placed in a water bath, ſaturated with ſea ſalt, and evaporated to the conſiſtence of an ointment.

273 intment f infuſion f cantha-des. *f.* UNGUENTUM INFUSI MELOES VESICATORII, E. Ointment of infuſion of cantharides.

To prepare this ointment, the Edinburgh college directs one part of cantharides to be macerated for a night in four parts of boiling water; the expreſt and ſtrained liquor to be boiled with two parts of hogs lard till the water is evaporated, then one part of yellow wax, and the ſame proportion of white roſin to be added; and when the whole is melted, and removed from the fire, two parts of Venice turpentine are to be mixed with it, and the whole ſtirred till cold.

274 intment f cantha-ides pow-er. *g.* UNGUENTUM PULVERIS MELOES VESICATORII, E. Ointment of cantharides powder.

This is prepared by mixing together ſeven parts of reſinous ointment, and one part of powdered cantharides.

All theſe ointments, beſides being uſed for keeping open bliſters, are occaſionally employed for iſſue ointments.

For more on the ſubject of bliſters, the reader is referred to Percival's Eſſays, vol. i. and Withers on the uſe and abuſe of Medicines.

Order 2. HEMIPTERA.

275 Cochineal. 13. COCCUS CACTI, E. COCCINELLA, L. D. Cochineal. See ENTOMOLOGY *Index.*

This is employed in medicine merely as a colouring-matter.

Order 5. HYMENOPTERA.

APIS MELLIFICA. The bee.

276 Honey. 14. MEL. *Honey.*

Beſides being uſed as an article of diet, honey is often employed medicinally, either for the preparation of electuaries, or for making a kind of ſyrups, called *oxymels* or *medicated honeys.* It generally proves gently laxative, but is apt to diſagree with the ſtomach, producing ſickneſs and griping. It might probably be entirely ſuperſeded by ſugar, which is not attended with thoſe unpleaſant effects.

Officinal Preparations.

277 Clarified honey. *a.* MEL DESPUMATUM. Clarified honey.

For the purpoſe of clarifying honey, the colleges of London and Dublin direct that it ſhould be melted in a water bath, removing the ſcum as it riſes.

In this way the honey is rendered more beautiful to the eye, but is ſcarcely leſs liable to diſagree with weak ſtomachs.

278 Acetated honey. *b.* MEL ACETATUM, L. OXYMEL SIMPLEX. Acetated honey. *Simple oxymel.*

Two pounds of clarified honey are boiled in a glaſs veſſel over a gentle fire, with one pound of diſtilled vinegar, till they are reduced to the conſiſtence of a ſyrup.

This is a uſeful remedy diluted with water and employed as a gargle, in coughs and ſore throats.

Order 7. APTERA.

279 Millepedes. 15. ONISCUS ASELLUS, E. MILLEPEDA, L. D. Millepedes or *Woodlice.*

Formerly employed as a diuretic in the form of pills, that were made either of the living animals, or of theſe killed by ſpirit of wine and powdered.

280 Crabs eyes. 16. CANCER ASTACUS, E. The cray fiſh. *Cancrorum lapilli. Crab's eyes.* See CHEMISTRY, N° 2582.

Officinal Preparations.

281 Prepared crabs eyes. *a.* CANCRORUM LAPILLI PRÆPARATI, E. Prepared crabs eyes.

Formerly much employed as an antacid, though not at all ſuperior to common carbonate of lime.

282 Crabs claws. 17. CANCER PAGURUS, E. The black-clawed crab. CHELÆ CANCRORUM, L. *Crabs claws.*

Officinal Preparations.

283 Prepared crabs claws. *a.* CHELÆ CANCRORUM PRÆPARATÆ, L. Prepared crabs claws.

Reduced to powder like the former, by levigation, diffuſion, filtration, and drying. Of ſimilar properties.

284 Compound powder of crabs claws. *b.* PULVIS CHELARUM CANCRI COMPOSITUS, L. Compound powder of crabs claws.

A mixture of one pound of prepared crabs claws, with three ounces of prepared chalk, and the ſame proportion of prepared red coral.

CLASS VI. WORMS. Order 2. MOLLUSCA.

285 Leeches. 18. HIRUDO MEDICINALIS. Medicinal leech. See HELMINTHOLOGY *Index.*

Order 3. TESTACEA.

286 Oyſter ſhells. 19. OSTREA EDULIS, E. OSTREA, L. D. Oyſter. See CONCHOLOGY *Index.* TESTÆ OSTREARUM. *Oyſter ſhells.* See CHEMISTRY, N° 2883.

Officinal Preparation.

287 Prepared oyſter ſhells. *a.* OSTREARUM TESTÆ PRÆPARATÆ, L. Prepared oyſter ſhells.

Prepared in the ſame way as crabs claws, poſſeſſing ſimilar properties.

Order 4. ZOOPHYTA.

288 Red coral. 20. GORGONIA NOBILIS. ISIS NOBILIS, E. CORALLIUM RUBRUM, L. D. Red coral. See CHEMISTRY, N° 2886.

Officinal Preparation.

289 Prepared red coral. *a.* CORALLIUM RUBRUM PRÆPARATUM. Prepared red coral.

As above.

290 Sponge. 21. SPONGIA OFFICINALIS, E. SPONGIA, L. D. Sponge. See HELMINTHOLOGY *Index.*

In its natural ſtate, ſponge is employed by ſurgeons, for cleanſing wounds and ulcers, for making tents, and for ſtopping hemorrhagies from ſmall divided blood veſſels.

Officinal Preparation.

291 Burnt ſponge. *a.* SPONGIA USTA, L. D. Burnt ſponge.

Sponge is burnt in a cloſe iron veſſel, after being cut into ſmall pieces and bruiſed to free it from earthy and ſtony matter. The burning is continued till the ſponge becomes black and friable, and it is then reduced to a fine powder.

Burnt ſponge has been long employed as a remedy in ſcrophulous affections. It ſeems to owe its beneficial operation (moſtly ſlight and uncertain) in theſe diſorders, partly to its alkaline and partly to its carbonaceous nature. Perhaps the firſt-mentioned may contribute to the ſolution and diffuſion (in the human body) of its coaly matter. It is given (made into a bolus, or lozenge) in doſes of a ſcruple, or half a dram, twice a-day.

It is likewiſe ſaid to be a remedy for the bronchocele, in which caſes it has been adminiſtered with ſucceſs in the following manner. The ſtomach and bowels having been duly cleanſed by a vomit and purge taken two days before, the patient, on going to bed, is to place a bolus conſiſting of half a dram of burnt ſponge, and as much honey as is neceſſary, in the mouth, under the tongue, and as it gradually diſſolves to ſwallow it. This bolus is to be repeated for ſix nights. A bitter powder made of five grains of chamomile flowers, gentian root, and the leſſer centaury tops, is to be taken every ſeventh day during the uſe of the bolus, and on the eighth day the purge is to be repeated. Others have employed ſponge in theſe caſes in the form of a lozenge, which is certainly more conveniently held in the mouth than a bolus *.

CHAP. II. *Vegetable Subſtances.*

SECT. I. *Vegetable products that are procured from plants in general, or from ſuch as are imperfectly known.*

292 Charcoal. 22. CARBO LIGNI, E. Charcoal. See CHEMISTRY *Index.*

For medical purpoſes charcoal ſhould be freſh burned, or ſhould be kept carefully excluded from the air. Its chief uſe is as an antiſeptic, correcting putridity; hence it is employed as a tooth-powder, either alone or mixed with aſtringents and aromatics, and is ſometimes given internally in diarrhœa and dyſentery, where the matters evacuated are very offenſive. It is alſo ſaid to act as a gentle laxative.

293 Wood ſoo 23. FULIGO LIGNI COMBUSTI. Wood ſoot.

This differs from charcoal in containing a conſiderable quantity of empyreumatic oil, to which the properties attributed to it as an antiſpaſmodic are to be aſcribed. It is now ſeldom uſed.

294 Common alcohol. 24. ALCOHOL, E. SPIRITUS VINOSUS RECTIFICATUS, L. SPIRITUS VINI RECTIFICATUS, D. Alcohol. *Rectified ſpirit of wine.*

For the uſual preparation, hiſtory and chemical properties of alcohol, ſee CHEMISTRY, Chap. xi. ſect. i.

The only certain mode of aſcertaining the purity of alcohol and its preparations is by taking their ſpecific gravity, for the manner of doing which ſee HYDRODYNAMICS. The ſpecific gravity of rectified ſpirit ſhould be 835.

Alcohol is one of the moſt violent ſtimuli with which we are acquainted. Applied externally it corrugates the ſolid parts of the body, and coagulates all the albuminous and gelatinous fluids with which it comes in contact. By violently contracting the ſmaller veſſels, it checks cles it stops hemorrhagies, and by destroying the ſenſibility of the extremities of nerves, it alleviates pain, and in ſome caſes removes ſpaſm. Taken undiluted into the ſtomach, it acts in a ſimilar manner, coagulating the fluids, and deſtroying nervous ſenſibility. If the quantity is conſiderable, it brings on apoplexy and palſy, followed by death. Sufficiently diluted alcohol acts as a tonic and gentle ſtimulus, exhilarating the ſpirits, increaſing the appetite, and promoting digeſtion; but a too frequent uſe of ardent ſpirits is attended with dangerous conſequences. See N° 102. It is a uſeful application to recent burns and ſcalds, preventing veſication.

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* Theſaur [illegible]

It muſt be remarked, that what the Edinburgh college have called alcohol is not pure alcohol.

Officinal Preparations.

295

a. Alcohol, L. D. Alcohol.

The proceſs for obtaining pure alcohol given by the London college is ſomewhat different from that of the Dublin college. The former directs a gallon of rectified ſpirit of wine to be mixed with an ounce of pure kali, and afterwards a pound of hot prepared kali to be added. The mixture is to be well ſhaken and ſet by for 24 hours, when the ſpirit is to be poured off, mixed with half a pound more prepared kali, and diſtilled in a water bath. The diſtilled alcohol ſhould have the ſpecific gravity of 815.

The proceſs of the Dublin pharmacopœia is as follows. Five pounds of rectified ſpirit are mixed with one ounce of cauſtic vegetable alkali, and then with one pound of pearl-aſhes dried over the fire and ſtill warm. This mixture is digeſted for three days, ſhaking it frequently; and then the ſpirit is poured off, and diſtilled till three pounds have come over. The Dublin alcohol has the ſpecific gravity of 820, and is conſequently weaker than that of the London pharmacopœia.

Pure alcohol is not employed in medicine, and therefore the college of Edinburgh have given no formula for its preparation.

296
Vitriolic
thereal
quor.

b. Liquor æthereus vitriolicus, D. Vitriolic ethereal liquor.

This is prepared by putting 32 ounces of rectified ſpirit of wine into a retort that is capable of ſupporting a ſudden heat, and pouring on it in a continued ſtream 32 ounces of ſulphuric acid, mixing them gradually; then placing the retort in heated ſand, and diſtilling off 16 ounces into a cool receiver, taking care ſo to regulate the heat that the mixture may boil as ſoon as poſſible. The ſpecific gravity ſhould be about 753.

In a ſimilar manner is prepared the

297
pirit of
triolic
ther.

Spiritus ætheris vitriolici, L. Spirit of vitriolic ether.

This preparation is an impure ether, and, when purified, as directed below, it forms the officinal *ſulphuric ether*.

It is employed as a ſtimulant in low fevers and febrile eruptions. Doſe from 60 to 100 drops.

298

c. Æther sulphuricus, E. ÆTHER VITRIOLICUS, L. D. Sulphuric ether. *Vitriolic ether.*

The colleges of London and Dublin direct their ſulphuric ether to be prepared by rectifying the former preparation by means of potaſh. According to the former, two pounds of ſpirit of vitriolic ether are to be mixed with one meaſured ounce of water of pure kali, and the mixture diſtilled with a gentle heat, till 14 meaſured ounces have come over. In the Dublin formula 16 ounces of vitriolic etherial liquor are mixed with two drams of powdered cauſtic vegetable alkali; and 10 ounces are diſtilled off.

The Edinburgh college direct 32 ounces of alcohol, and the ſame quantity of ſulphuric acid, to be mixed together in a proper retort, and 16 ounces to be diſtilled over from a ſand heat ſuddenly applied. To the diſtilled liquor are then to be added two drachms of potaſh, and from a very high retort 10 ounces are to be diſtilled with a gentle fire.

On the chemical nature and properties of ſulphuric ether, ſee Chemistry, Chap. XI. Sect. II. Its ſpecific gravity ſhould be about 739.

The medical uſes of ether are thus deſcribed by Dr Duncan. "As a medicine taken internally, it is an excellent antiſpaſmodic, cordial, and ſtimulant. In catarrhal and aſthmatic complaints, its vapour is inhaled with advantage, by holding in the mouth a piece of ſugar, on which ether has been dropt. It is given as a cordial in nauſea, and in febrile diſeaſes of the typhoid type, as an antiſpaſmodic in hyſteria, and in other ſpaſmodic and painful diſeaſes; and as a ſtimulus in ſoporoſe and apoplectic affections. Regular practitioners ſeldom give ſo much as half an ounce, much more frequently only a few drops, for a doſe; but empirics have ſometimes ventured upon much larger quantities, and with incredible benefit. When applied externally, it is capable of producing two very oppoſite effects, according to its management; for if it be prevented from evaporating, by covering the place to which it is applied cloſely with the hand, it proves a powerful ſtimulant and rubefacient, and excites a ſenſation of burning heat. In this way it is frequently uſed for removing pains in the head or teeth. On the contrary, if it be dropt on any part of the body expoſed freely to the contact of the air, its rapid evaporation produces an intenſe degree of cold; and this is attended with a proportional diminution of bulk in the part to which it is applied: in this way it has frequently facilitated the reduction of ſtrangulated hernia *."

d. Æther sulphuricus cum Alcohole, E. Sulphuric ether with alcohol.

ether with

This is prepared by mixing together one part of ſulphuric ether, and two parts of alcohol. In nature and properties it agrees with the *ſpiritus ætheris vitriolici* of the London Pharmacopœia.

e. Oleum Vini, L. Oil of wine.

This preparation is made by mixing together one part of alcohol, and the ſame quantity of ſulphuric acid, and diſtilling, taking care that no black froth paſs into the receiver. The oily part of the diſtilled liquor is to be ſeparated from the volatile acid; and to the former is to be added as much water and pure kali, as is ſufficient to correct the ſulphureous ſmell. Then a gentle heat is to be applied to diſtil off the little ether that

Simple and Officinal Medicines.

* *Duncan's Diſpenſatory.*

[illegible] and the oil that floats on the remaining fluid is to be ſeparated and preſerved for uſe.

This is employed chiefly as an ingredient in the following preparation; though it is ſometimes given alone as a ſtimulus, in a doſe from 10 to 20 drops.

301 Compound ſpirit of vitriolic ether.

f. Spiritus Ætheris vitriolici compositus, L. Compound ſpirit of vitriolic ether.

Prepared by mixing two pounds of ſpirit of vitriolic ether, and three drams of the oil of wine.

It is employed as an antiſpaſmodic in ſimilar caſes, and doſes, as ſulphuric ether.

302 Oily ethereal liquor.

g. Liquor æthereus oleosus, D. LIQUOR HOFFMANNI ANODYNUS. Oily ethereal liquor. *Hoffmann's anodyne liquor.*

Made by diſtilling to one half the liquor that remains after preparing the Dublin vitriolic ether.

Similar in its properties to ether, but weaker. It is much the ſame as the former.

303 Aromatic ſulphuric ether with alcohol.

h. Æther sulphuricus cum Alcohole aromaticus, E. Aromatic ſulphuric ether with alcohol.

This is prepared by digeſting, for ſeven days, an ounce of bruiſed cinnamon, an ounce of bruiſed leſſer cardamom ſeeds, and two drams of powdered long pepper, in two pounds and a half of ſulphuric ether with alcohol.

A powerful ſtimulant and tonic. Doſe 30 drops to a dram.

304 Diluted alcohol.

25. Alcohol dilutum, E. SPIRITUS VINOSUS TENUIOR, L. SPIRITUS VINI TENUIOR, D. Diluted alcohol. *Weaker ſpirit of wine. Proof ſpirit.*

This is rectified ſpirit lowered with water to what is called *proof ſtrength*, having a ſpecific gravity of about 935. In all its eſſential properties it reſembles common ſpirits, and either whiſky or Britiſh ſpirit may be uſed for it. The proof ſpirit of commerce is uſually diſtilled either from molaſſes or grain.

In pharmacy it is employed as a menſtruum for making various tinctures.

305 Common acetous acid.

26. Acidum acetosum impurum. ACETUM VINI, D. ACETUM, L. Impure acetous acid. *Vinegar.*

As the vinegar commonly met with is made from other fermented liquors beſides the juice of the grape, we have inſerted it here among the vegetable principles. On the production and properties of vinegar, ſee Chemistry, N° 649 and 2310. Common vinegar, beſides diluted acetous acid, contains tartaric acid, tartrate of potaſh, ſupertartrate of potaſh, and mucilage. It ſhould be tranſparent, of a pale yellow colour, fragrant pungent ſmell, and an agreeable ſharp taſte. It is ſeldom employed in medicine before it is purified by diſtillation or other proceſſes to be immediately mentioned. Vinegar is a good family remedy as a refrigerant in fevers, as a ſtimulant external application in bruiſes, ſprains, &c. and vinegar whey made by coagulating warm milk by means of good vinegar, is one of the beſt auxiliary diaphoretics with which we are acquainted.

Officinal Preparations.

306 Diſtilled acetous acid.

a. Acidum acetosum destillatum, E. ACETUM DISTILLATUM, L. D.

The Edinburgh college directs eight pounds of common acetous acid to be diſtilled in a glaſs veſſel with a gentle heat, ſetting aſide the firſt two pounds that come over, and preſerving the next four pounds. The Dublin college directs 10 pounds of vinegar to be put into the ſtill, and ſix pounds to be drawn off at once; and the London college, from five pounds, directs that there ſhould be diſtilled off as much as comes over free from empyreuma.

Diſtilled vinegar is freed from the ſalts and mucilage contained in common vinegar, and therefore is purer and keeps better; but it is much weaker than good vinegar. If it has been diſtilled in glaſs veſſels it can have acquired no metallic impregnation; but it is ſometimes, as well as common vinegar, adulterated with ſulphuric acid to make it appear ſtronger. This fraud may be detected by adding *muriate of baryta*, which will produce a white precipitate if ſulphuric acid be preſent.

It is employed for gargles, for preparing various *acetates*, and other officinal medicines. It is alſo given as a refrigerant diluted with water in feveriſh diſorders, and is applied externally.

307 Strong acetous acid.

b. Acidum acetosum forte, E. ACIDUM ACETOSUM, L. Strong acetous acid. *Radical vinegar. Acetic acid.*

By the Edinburgh proceſs, a pound of dried ſulphate of iron is to be rubbed with 10 ounces of acetate of lead; the mixture is then to be put into a retort, and diſtilled as long as any acid comes over. The London college directs two pounds of coarſely-powdered verdigris, well dried by means of a water bath, ſaturated with ſea ſalt, to be put into a retort and diſtilled, repeating the diſtillation with the liquor that comes over.

On the production and properties of this acid, ſee Chemistry, N° 652, *et ſeq.* Its ſpecific gravity ſhould be about 1060. It is ſometimes contaminated with ſulphurous acid or with lead. The former may be diſcovered by the unpleaſant tickling cough it then occaſions when ſnuffed up the noſe; and the latter by adding ſulphuret of ammonia, by which, if lead be preſent, the liquor will be tinged of a dark brown.

This preparation is employed chiefly as a ſtimulant to be ſnuffed up the noſe in ſyncope, hyſteria, and ſimilar affections: externally it acts as a rubefacient. Both this and the two following may be uſed as fumigations to correct the bad ſmell of ſick rooms.

308 Aromatic vinegar.

c. Acetum aromaticum, E. Aromatic vinegar. *Vinegar of the four thieves.*

Made by macerating four ounces of dried roſemary tops, four ounces of dried ſage leaves, two ounces of dried lavender flowers, and two drams of cloves, in eight pounds of diſtilled acetous acid for ſeven days, and ſtraining.

Sometimes given as a ſtimulus, diluted with water in typhus.

309 C pho- r d ace- t acid.

d. ACIDUM ACETOSUM CAMPHORATUM, E. Camphorated acetous acid.

Prepared by diſſolving half an ounce of camphor, reduced to powder by being rubbed with alcohol, in ſix ounces of ſtrong acetous acid.

This ſhould be kept in glaſs phials with ground ſtoppers. It is an excellent ſtimulus for ſnuffing up the noſtrils.

310 ſ up of tous i.

e. SYRUPUS ACIDI ACETOSI, E. Syrup of acetous acid.

This is prepared by boiling together two pounds and a half of acetous acid (*common vinegar*), and three pounds and a half of double refined ſugar.

Uſed in the ſame caſes as acetated honey, (ſee N° 277.) to which it is preferable.

311 tate of ſh.

f. ACETAS POTASSÆ, E. KALI ACETATUM, L. ALKALI VEGETABILE ACETATUM, D. SAL DIURETICUS. Acetate of potaſh. *Acetated kali. Acetated vegetable alkali. Diuretic ſalt.*

This ſalt is made by boiling any quantity of ſubcarbonate of potaſh with diſtilled acetous acid, firſt uſing about five times its weight, and, during the boiling, gradually adding more till all efferveſcence ceaſes, ſlowly evaporating to dryneſs, fuſing the dry ſalt, then diſſolving it in water, and ſlowly evaporating the ſolution till there remains a dry white ſaline maſs, which is to be kept well ſtopt from the air, in which it deliqueſces. See CHEMISTRY, N° 987.

Acetate of potaſh is employed as a diuretic in a doſe of from one to four ſcruples, and in a dilute ſolution as a refrigerant in fevers, &c.

312 ure ſub- onate taſh.

27. SUBCARBONAS POTASSÆ IMPURUS. CARBONAS POTASSÆ IMPURUS, E. CINERES CLAVELLATI, L. ALKALI FIXUM VEGETABILE, D. Impure ſubcarbonate of potaſh. *Potaſhes. Pearlaſhes. Fixed vegetable alkali.*

For the production and nature of this alkaline ſubſtance, ſee CHEMISTRY, Chap. XII. Sect. I. It is ſeldom employed in pharmacy, except as the baſis of ſome *officinal preparations.*

313 carbo- e of pot-

a. SUBCARBONAS POTASSÆ. CARBONAS POTASSÆ, E. KALI PRÆPARATUM, L. ALKALI VEGETABILE MITE, D. Subcarbonate of potaſh. *Carbonate of potaſh. Prepared kali. Mild vegetable alkali.*

This is uſually prepared from the former ſubſtance, which is purified by burning it in a crucible, then diſſolving it in water, filtering and evaporating to dryneſs in a clean iron pot, ſtirring the maſs as it dries, to prevent its coaleſcing into one cake.

This ſalt appears in ſmall white grains of ſcarcely any perceptible ſmell, but of a hot alkaline taſte. When pure, it ſhould diſſolve entirely in cold water, and ſhould deliqueſce in moiſt air into a limpid tranſparent fluid.

As uſually made, it contains a conſiderable proportion of ſulphate of potaſh, which may be ſeparated from it by mixing it with its own weight of water, and allowing it to ſtand till cold, when moſt of the ſulphate of potaſh is ſeparated in cryſtals.

This alkaline carbonate is employed as a diuretic, mixed with infuſion of chamomile and ſpirit of juniper, in a doſe of about a ſcruple repeated occaſionally; and as an antacid. It is alſo employed in combination with citric acid, to relieve nauſea and check vomiting.

314 Water of prepared kali.

b. AQUA KALI PRÆPARATI, L. LIXIVIUM MITE, D. Water of prepared kali. *Mild ley.*

This is made by allowing ſubcarbonate of potaſh to deliqueſce in a moiſt atmoſphere, and ſtraining it; or, by diſſolving it in an equal weight of water.

It poſſeſſes the ſame properties as the dry carbonate, and is employed chiefly for decompoſing other ſalts.

315 Water of carbonate of potaſh.

c. AQUA CARBONATIS POTASSÆ. AQUA SUPER-CARBONATIS POTASSÆ, E. LIQUOR ALKALI VEGETABILIS MITISSIMI, D. Water of carbonate of potaſh. *Solution of mildeſt vegetable alkali.*

This is properly a neutral ſalt, and is prepared by diſſolving ſubcarbonate of potaſh in water, and ſaturating it with carbonic acid, by paſſing through it a ſtream of this gas, ariſing from the decompoſition of carbonate of lime by diluted ſulphuric acid.

On the nature of this ſalt, ſee CHEMISTRY, N° 109, 174.

By this means the alkaline carbonate is better adapted for internal uſe, as it is rendered not only more pleaſant to the taſte; but is leſs apt to offend the ſtomach. Indeed it is the only form in which we can exhibit potaſh in ſufficient doſes, and for a ſufficient length of time, to derive much benefit from its uſe in calculous complaints. It has certainly been frequently of advantage in theſe affections, but probably only in thoſe inſtances in which the ſtone conſiſts of uric acid, or urate of ammonia; for though ſuperſaturated with carbonic acid, yet the affinity of that acid for potaſh is ſo weak, that it really operates as an alkali.

Six or eight ounces may be taken two or three times a-day. It in generally proves powerfully diuretic, and ſometimes produces inebriation. This laſt effect is aſcribed to the carbonic acid.

316 Wa

d. AQUA POTASSÆ, E. AQUA KALI PURI, L. LIXIVIUM CAUSTICUM, D. Water of potaſh. *Water of pure kali. Cauſtic ley.*

The following is the Edinburgh proceſs for obtaining a ſolution of pure potaſh.

Take of newly prepared lime, eight ounces; carbonate of potaſh, ſix ounces. Put the lime into an iron or earthen veſſel, with 28 ounces of warm water. After the ebullition is finiſhed, inſtantly add the ſalt, and having thoroughly mixed them, cover the veſſel till they cool. When the mixture has cooled, agitate it well, and pour it into a glaſs funnel, whoſe throat muſt be obſtructed with a piece of clean linen. Cover the upper orifice of the funnel, and inſert its tube into another glaſs veſſel, ſo that the water of potaſh may gradually drop through the rag into the lower veſſel. As ſoon as it ceaſes to drop, pour into the funnel ſome ounce of water, but cautiouſly, ſo that it may ſwim above the matter. The water of potaſh will again begin to drop, and the affuſion of water is to be repeated in the ſame manner, until three pounds have dropped, which will happen in the ſpace of two or three days; then mix the ſuperior and inferior parts of the liquor together by agitation, and keep it in a well-ſtopped phial.

From this proceſs thoſe of the London and Dublin colleges do not materially differ. For other methods of procuring pure potaſh, ſee CHEMISTRY, N° 905, *et ſeq.*

This preparation was formerly much employed in calculous diſorders. F[illegible] drops were given in gruel, milk, or broth, twice or thrice a-day; but even in theſe [illegible] it [illegible] proved highly injurious, when long continued, [illegible] the organs of digeſtion. Hence it has been juſtly ſuperſeded by the ſolution of carbonate of potaſh above mentioned.

317 Potaſh. *e.* POTASSA, E. KALI PURUM, L. ALKALI VEGETABILE CAUSTICUM, D. LAPIS INFERNALIS. Potaſh. *Pure kali. Cauſtic vegetable alkali. Common ſtronger cauſtic.*

This is made by evaporating any quantity of the ſolution of potaſh in a very clean covered iron veſſel, till on the ebullition ceaſing, the ſaline matter flows like oil, which happens before the veſſel becomes red. The maſs is then to be poured out on a ſmooth iron plate, till it be divided into ſmall pieces before it hardens, when it muſt be depoſited in a well-ſtopt phial.

This has been long employed by ſurgeons as a cauſtic; but its uſe in this way is inconvenient, as from its rapid deliqueſcence it is not eaſily confined.

318 Potaſh with lime. *f.* POTASSA CUM CALCE, E. CALX CUM KALI PURO, L. CAUSTICUM MITIUS, D. Potaſh with lime. *Lime with pure kali. Milder cauſtic.*

Made by evaporating in a covered iron veſſel any quantity of ſolution of potaſh till it is reduced to a third, and then gradually adding as much newly ſlaked or powdered lime as is ſufficient to form a thick maſs, which is to be kept in a cloſely ſtopped veſſel. This is employed as a cauſtic, and is milder in its operation, and more manageable than the laſt.

319 Bees wax. 28. CERA. Bees wax.

Though wax is generally obtained from honeycombs, we have here introduced it as a vegetable principle, ſince modern chemiſtry has ſhown that it may be obtained by certain proceſſes from moſt vegetables. See CHEMISTRY, N° 2432.

Two varieties of wax are employed in medicine, *cera flava*, yellow wax, which is the wax as it is naturally procured from the comb, and *cera alba*, white wax, bleached by art. They do not differ in their ſenſible properties, and the white wax is only preferable to the yellow, from its making ointments, &c. of a more delicate colour.

Wax is ſeldom employed internally, though it is ſometimes adminiſtered as an emollient by way of emulſion in diarrhœa and dyſentery. It is uſed chiefly for preparing ointments, liniments, and cerates.

Officinal Preparations.

a. LINIMENTUM SIMPLEX, E. Simple liniment. 320 Simple liniment.

Made by melting together one part of white wax, and four of olive oil.

b. UNGUENTUM SIMPLEX, E. Simple ointment. 321 Simple ointment.

This differs from the laſt, only in its proportions, being compoſed of two parts of white wax, and four of olive oil.

c. UNGUENTUM CEREUM, L. D. Wax ointment. 322 Wax ointment.

Made by melting together four ounces of white wax, three ounces of ſpermaceti, and a pint of olive oil.

d. EMPLASTRUM SIMPLEX, E. EMPLASTRUM CERÆ, D. EMPLASTRUM CERÆ COMPOSITUM, L. Simple plaſter. *Wax plaſter. Compound wax plaſter.* 323 Simple plaſter.

The Edinburgh preparation is compoſed of three parts of yellow wax, and of mutton ſuet and white roſin each two parts; that of the London and Dublin colleges is formed from yellow wax and mutton ſuet, each three pounds, and yellow roſin one pound.

29. AMMONIACUM. Gum ammoniac. 324 Ammoniacum.

This is a common concrete, gummy, reſinous juice from the Eaſt Indies, generally in large maſſes, compoſed of little lumps or tears, of a milky whiteneſs: the external parts of the maſs are commonly yellowiſh or browniſh, and the white tears change to the ſame colour on being expoſed for ſome time to the air. Of the plant from which it is extracted, we have no further knowledge, than what is learnt from the ſeeds found among the tears, which reſemble thoſe of dill, except that they are larger, and apparently belong to a plant of the umbelliferous kind.

Ammoniacum has a ſtrong ſmell, and a nauſeous ſweetiſh taſte, which is followed by a bitter one. It is frequently made uſe of in aſthmas, in menſtrual ſuppreſſions, and cachectic indiſpoſitions. In obſtructions of the breaſt it is accounted the moſt effectual of the aperient gums: in hyſteric caſes, ſome of the others are preferred or joined to it, on account, chiefly, of their more powerful ſmell. It is moſt commodiouſly taken in the form of pills; the doſe is a ſcruple or half a dram, every night or oftener: in larger doſes, as a dram, it generally looſens the belly. Applied externally, it is ſuppoſed to diſcuſs hard indolent tumours.

Officinal Preparations.

a. AMMONIACUM PURIFICATUM. Purified gum ammoniac. 325 Purified gum ammoniac.

Ammoniacum is purified by melting it in hot water, ſqueezing it through linen, and evaporating to a proper conſiſtence.

b. LAC AMMONIACI, L. D. Emulſion of gum ammonia. 326 Emulſion gum ammoniac.

Made by triturating two drams of ammoniac with half a pint of diſtilled water till an emulſion is formed.

Given in moſt caſes where ammoniac is uſed as an expectorant. Doſe an ounce or two, repeated occaſionally.

c. Emplastrum gummosum, E. Gum plaſter.

Made by melting together eight parts of plaſter of ſemivitrified oxide of lead, one part of gum ammoniac, and the ſame proportion of galbanum and yellow wax. Employed to form adheſive plaſters.

327 Myrrh.

30. Myrrha. Myrrh.

Myrrh is a gum reſin brought from the Eaſt Indies, or from Abyſſinia. The beſt myrrh is in the form of tears. It ſhould be of a yellow, or reddiſh yellow colour, becoming redder when breathed on, light, brittle, of an unctuous feel, pellucid, ſhining, preſenting white ſemicircular ſtriæ in its fracture; of a very bitter aromatic taſte, and a ſtrong, peculiar, not unpleaſant odour. It is not good if whitiſh, dark-coloured, black, reſinous, ill-ſmelled, or mixed with impurities, which is too commonly the caſe.

Neumann aſcertained that water and alcohol are both of them capable of taking up the whole of the taſte and ſmell of the myrrh, the extract made by either after the other being inſipid. The alcohol diſtilled from the tincture elevated none of the flavour of the myrrh; but during the inſpiſſation of the decoction a volatile oil aroſe, containing the whole of the flavour of the myrrh, and heavier than water, while the extract was merely bitter. From 7680 parts of myrrh he got 6000 watery extract, 180 volatile oil, and 720 alcoholic; and inverſely, 2400 alcoholic, and 4200 watery. Dr Duncan junior has obſerved that the tincture is tranſparent, and when poured into water, forms a yellow opaque fluid, but lets fall no precipitate, while the watery ſolution is always yellow and opaque; and that myrrh is not fuſible, and is difficultly inflammable. Mr Hatchett found it ſoluble in alkalies.

Myrrh is a heating ſtimulating medicine. It frequently occaſions a mild diaphoreſis, and promotes the fluid ſecretions in general. Hence it proves ſerviceable in cachectic diſeaſes, ariſing from inactivity of the ſyſtem, and is ſuppoſed to act eſpecially upon the uterine ſyſtem, and to reſiſt putrefaction.

It is exhibited in ſubſtance; in the form of powder, or made up into pills, in doſes of 10 to 60 grains; diſſolved in water, as in Griffith's famous, but unchemical, myrrh mixture; and diſſolved in alcohol *.

Officinal Preparations.

328 Tincture of myrrh.

a. Tinctura Myrrhæ. Tincture of myrrh.

This tincture is made by digeſting three ounces of powdered myrrh in about 20 ounces of alcohol, mixed with 10 ounces of water, according to the Edinburgh proceſs; half a pint of alcohol, with a pint and a half of proof ſpirit, according to the London college; or two pounds of alcohol according to that of Dublin, for ſeven or eight days.

Tincture of myrrh is ſeldom given internally, its principal uſe being as an external application, either as a gargle, or as a lotion for cleanſing foul ulcers, and promoting the exfoliation of carious bones.

329 Compound powder of myrrh.

b. Pulvis Myrrhæ compositus L. Compound powder of myrrh.

Made by rubbing together into a powder equal parts of myrrh, dried ſavin, dried rue, and Ruſſian caſtor.

Given as a ſtimulus in uterine obſtructions. Doſe from a ſcruple to a dram ſeveral times in the day.

330 Sagapenum.

31. Sagapenum. See Chemistry, N° 2495.

Sagapenum is employed as a ſtimulant and antiſpaſmodic, chiefly in combination with other gum reſins, to be mentioned hereafter.

331 Anguſtura.

32. Angustura. CORTEX ANGUSTURÆ. Anguſtura bark.

This bark was ſome years ago introduced into this country from the Weſt Indies. It is not certainly known of what tree it is the produce, but it is probable that it is a ſpecies of cinchona. It is thus deſcribed by Mr Brande. "There is a conſiderable variety in the external appearance of the anguſtura bark, owing, however, probably, to its having been taken from trees of different ſizes and ages, or from various parts of the ſame tree, as the taſte and other properties perfectly agree. Some parcels (ſays Mr Brande) which I have examined, conſiſt chiefly of ſlips torn from branches which could not have exceeded the thickneſs of a finger. Theſe are often ſmooth, three feet or more in length, and rolled up into ſmall bundles. In others, the pieces have evidently been, for the greater part, taken from the trunk of a large tree, and are nearly flat, with quills of all ſizes intermixed.

"The outer ſurface of the anguſtura bark, when good, is in general more or leſs wrinkled, and covered with a coat of a grayiſh white, below which it is brown, with a yellow caſt: the inner ſurface is of a dull browniſh yellow colour. It breaks ſhort and reſinous. The ſmell is ſingular and unpleaſant, but not very powerful; the taſte intenſely bitter, and ſlightly aromatic; in ſome degree reſembling bitter almonds, but very laſting, and leaving a ſenſe of heat and pungency in the throat. This bark, when powdered, is not unlike the powder of Indian rhubarb. It burns pretty freely, but without any particular ſmell *."

It is employed as a tonic, generally in ſubſtance; doſe from 15 to 30 grains. It may alſo be given in the form of infuſion, decoction, tincture, or extract. It is well adapted to caſes of debility of the alimentary canal.

332 Columbo root.

33. Colomba. RADIX COLOMBÆ. Columbo root.

This root is brought from Columbo, a town in the iſland of Ceylon, to which it was originally tranſplanted from the continent of India. It is called by the Portugueſe *Raiz de Moſambique*. We are as yet unacquainted with the vegetable of which it is a part.

Columbo root comes to us in circular pieces, which are from half an inch to three inches in diameter, and from two inches to a quarter of an inch in length. The ſides are covered with a thick wrinkled bark, of a dark brown colour externally, but of a light colour within. The ſurfaces of the tranſverſe ſections appear very unequal, highest at the edges, with a concavity towards the centre. On paring off this rough ſurface, the root is ſeen to conſiſt of three laminæ, the cortical, ligneous, and medullary. This laſt is much the ſofteſt, and, when chewed, ſeems very mucilaginous. A number of ſmall fibres run longitudinally through it, and appear on the ſurface. The cortical and ligneous parts are divided by a circular black line. All the thicker pieces have ſmall holes drilled through them, for the convenience of drying.

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* Duncan's Diſpenſatory.

* See Brande on the Anguſtura bark.

This root has an aromatic ſmell, but is diſagreeably bitter and pungent to the taſte, reſembling muſtard ſeed long kept.

This is an excellent bitter tonic, uſeful in debilities of the ſtomach and inteſtinal canal, in bilious diarrhœas, in bilious fevers, in which it ſometimes agrees when Peruvian bark fails; in the nauſea and vomiting attending pregnancy. It is uſually given in ſubſtance, in a doſe from 15 grains to half a dram, or by way of infuſion.

Officinal Preparation.

333 Tincture of columbo. TINCTURA COLOMBÆ, E. L. Tincture of Columbo.

The Edinburgh college direct this tincture to be made, by digeſting for eight days two ounces of columbo root in two pounds of diluted alcohol. The London tincture is ſtronger than this, being made with two ounces and a half of the root to two pints of proof ſpirit. This tincture may be given in a doſe of a dram or two.

For ſome valuable obſervations on the nature and uſes of columbo root, ſee *Percival's Eſſays*, vol. ii.

SECT. II. *Medicinal Vegetables, arranged according to the Syſtem of Linnæus.*

CLASS I. MONANDRIA. Order 1. MONOGYNIA.

334 Round zedoary. 34. KÆMPFERIA ROTUNDA. ZEDOARIA, L. Round zedoary root.

This is a ſpicy root brought from the Eaſt Indies, in pieces about an inch long, rather rough on the ſurface, and commonly terminating in a point. It is ſeldom employed except as an ingredient in an aromatic electuary to be afterwards mentioned.

335 Turmeric root. 35. CURCUMA LONGA. CURCUMA, L. Turmeric root.

This is brought from the Eaſt Indies, where it is employed as a ſpice. The roots are tuberous, long, knotty, and wrinkled; of a pale yellow colour externally, and a ſhining ſaffron brown within; of a weak aromatic ſmell, and a warm, ſlightly bitter taſte.

Seldom employed in this country as a remedy, but much uſed in the compoſition of curry powder.

336 Ginger. 36. AMOMUM ZINGIBER, E. ZINGIBER, L. D. Ginger root. See BOTANY, p. 76.

This is the leaſt acrimonious of all the foreign aromatics. It may be taken in conſiderable quantities, either with food or as a medicine. It is an excellent ſtimulant, peculiarly ſuited to the conſtitutions of thoſe whoſe ſtomachs are ſubject to flatulency, atonic gout, and other diſorders marked by want of energy in the organs of digeſtion. In theſe caſes it may be given either by itſelf, or combined with bitters and other tonics. It is [illegible]. It is a common and uſeful addition to cathartic medicines, particularly to infuſions and tinctures of the vegetable cathartics, ſerving to moderate their irritating action on the bowels. The pulverized root may be given in doſes from 10 to 30 grains. It has ſometimes been uſed with advantage as a maſticatory in ſcirrhous affections of the tonſils. It is often preſcribed in the form of a watery infuſion, made by ſteeping two ounces of the bruiſed root in one pint of boiling water. A ſmall wine glaſs full of ſuch an infuſion, taken warm three or four times a day, has afforded great relief in many caſes of gouty dyſpepſia.

Officinal Preparations.

337 Tincture of ginger. *a*. TINCTURA ZINGIBERIS. L. Tincture of ginger.

This is made by digeſting two ounces of powdered ginger in two pounds of proof ſpirit, for eight days. It may be given in a doſe of two or three drams, mixed with water.

338 Syrup of ginger. *b*. SYRUPUS AMOMI ZINGIBERIS, E. SYRUPUS ZINGIBERIS, L. Syrup of ginger.

The Edinburgh ſyrup is made by macerating three ounces of beaten ginger in four pounds of boiling water for 24 hours in a covered veſſel, and then forming the ſyrup by adding ſeven pounds and a half of double refined ſugar. The ſyrup of the London college is made with four ounces of bruiſed ginger to three pints of boiling diſtilled water, adding a ſufficient quantity of double refined ſugar to make a ſyrup.

A uſeful addition to ſtimulating mixtures, and employed in pharmacy as a conſtituent in ſeveral electuaries and pills.

339 Long zedoary. 37. AMOMUM ZEDOARIA, D. Long zedoary root.

A ſpicy root brought from the Eaſt Indies, eſpecially from Ceylon, much reſembling the kæmpferia in properties, but rather ſtronger.

340 Leſſer cardamon ſeeds. 38. AMOMUM CARDAMOMUM. AMOMUM REPENS, E. CARDAMOMUM MINUS, L. D. Leſſer cardamom ſeeds.

It is uncertain whether theſe ſeeds are the produce of the *amomum cardamomum* or *repens*. They are brought from the Eaſt Indies, and form a very grateful aromatic, frequently employed in practice as a ſtimulant. They are brought to us in little whitiſh, roundiſh, triangular, pointed pods. The ſeeds are of a dark brown colour, of a fragrant ſmell, and pungent, rather ſaltiſh taſte. The huſks are ſeparated from the reſt by beating them in a mortar.

Officinal Preparations.

341 Tincture of cardamom ſeeds. TINCTURA AMOMI REPENTIS, E. TINCTURA CARDAMOMI, L. D. Tincture of cardamom ſeeds.

The Edinburgh tincture is made by digeſting for ſeven days, four ounces of bruiſed cardamom ſeeds in two pounds and a half of diluted alcohol. In the London formula, three ounces of the ſeeds are digeſted for eight days in two pints of proof ſpirit. Doſe two or three drams.

342 Compound tincture of cardamom ſeeds. *b*. TINCTURA CARDAMOMI COMPOSITA, L. D. Compound tincture of cardamom ſeeds.

Made by digeſting two drams of leſſer cardamom ſeeds powdered, the ſame quantity of powdered caraway ſeeds (and in the London formula, of cochineal), half an ounce of bruiſed cinnamon, and four ounces of ſtoned raiſins, in two pints, (or according to the Dublin college, two pounds), of proof ſpirit for 14 days.

A very grateful aromatic tincture, ſometimes given alone as a cordial, in a doſe of three or four drams, but more commonly added to ſtimulant draughts and juleps, to which it gives a fine rich colour.

343 Galangal root. 39. Maranta Galanga. GALANGA. Galangal root.

Sometimes employed as a warm aromatic, in a doſe of about a ſcruple.

Class II. DIANDRIA. Order 1. Monogynia.

344 Olive oil. 40. Olea Europæa, E. OLIVA, L. D. The olive tree. OLEUM OLIVÆ. Olive oil.

Pure olive oil ſhould have a fine rich greeniſh yellow colour, with ſcarcely any perceptible taſte or ſmell; ſhould be perfectly tranſparent, and ſhould congeal at about 38° of Fahrenheit. It is brought to us from the ſouth of France, from Italy, and the Levant. The beſt is ſuppoſed to come from Florence.

Olive oil is chiefly employed as an emollient, both externally and internally. Internally it is ſometimes employed as a gentle laxative, and to moderate the action of acrid ſubſtances, eſpecially poiſons. It has been given as an anthelmintic, either alone or formed into an emulſion with ammonia.

345 Hedge hyſſop. 41. Gratiola officinalis, E. GRATIOLA, L. Hedge hyſſop.

This plant, when dried, is ſometimes employed as a draſtic purgative and anthelmintic, given in ſubſtance, in a doſe of from 20 to 30 grains, or by way of infuſion, to the extent of 3 drams. Its uſe requires caution.

346 Roſemary. 42. Rosmarinus officinalis, E. ROSMARINUS, L. D. Roſemary.

The tops of roſemary are uſed as a ſtimulant, and form an ingredient in ſome tinctures. Roſemary owes its ſtimulating powers to its eſſential oil, which is very ſimilar to camphor.

Officinal Preparations.

347 Volatile oil of roſemary. *a.* Oleum volatile Rorismarini officinalis, E. OLEUM RORISMARINI, L. Volatile oil of roſemary.

This oil, like moſt of the other volatile oils of aromatic plants, is obtained by diſtilling the plant with a ſufficient quantity of water to prevent burning, and ſeparating the oil that floats on the ſurface of the diſtilled liquor, by means of a funnel with a long capillary tube.

Oil of roſemary is ſeldom employed alone, but it may be given in a doſe of a few drops as a ſtimulant.

348 Spirit of roſemary. *b.* Spiritus Rorismarini officinalis, E. SPIRITUS RORISMARINI, L. Spirit of roſemary.

Made by diſtilling 2 pounds, or, according to the London college a pound and a half, of roſemary tops, with a gallon of diluted alcohol, and a ſufficient quantity of water to prevent burning, diſtilling off a gallon.

Chiefly employed to form ſome compound tinctures, or as an external ſtimulant, in which way it is commonly uſed under the name of *Hungary water*.

349 Sage. 43. Salvia officinalis. E. SALVIA, L. D. Sage leaves.

An infuſion of ſage leaves is ſometimes employed as a refreſhing drink in fevers, and has been recommended as a tonic in nervous debilities and dyſpepſia. It forms a good ſubſtitute for Chineſe tea.

350 Brooklime. 44. Veronica Beccabunga. BECABUNGA, L. D. Brooklime. See Botany, p. 84.

A common ſucculent plant that has been recommended as an excellent antiſcorbutic.

Order 3. Trigynia.

351 Black pepper. 45. Piper nigrum. Black pepper.

This is brought from the Eaſt Indies, being cultivated chiefly in Java and Malabar. White pepper is the ſame fruit, with the black bark taken off.

Pepper is one of the moſt heating ſpices, and is ſaid ſometimes to act violently on the kidneys, ſo as when taken in large quantities to excite nephritis. It is not frequently given internally as a ſtimulant, eſpecially in the form of powder. A few grains of white pepper ſwallowed whole, are recommended by ſome practitioners, as a remedy in the debility of the digeſtive organs.

352 Cubebs. 46. Piper Cubeba. CUBEBA. L. Cubebs.

Theſe are ſcarcely to be diſtinguiſhed by the eye from common pepper, except in being furniſhed with a long ſlender ſtalk. They are brought from Java. In ſtimulating properties they reſemble pepper, but are much weaker, and are ſeldom uſed.

353 Long pepper. 47. Piper longum. Long pepper.

Long pepper appears in ſmall round grains, diſpoſed ſpirally in a long cylindrical head. It is extremely pungent, and has a kind of ſaltiſh taſte. It is employed chiefly as an ingredient in an aromatic electuary and tincture.

Class III. TRIANDRIA. Order 1. Monogynia.

354 Valerian root. 48. Valeriana officinalis, E. VALERIANA SYLVESTRIS, L. D. Valerian root.

This root conſiſts of a number of ſtrings or fibres, of a pale browniſh colour, proceeding from a common ſtock, and matted together. It has a very ſtrong, unpleaſant ſmell, and a warm, bitteriſh, acrid taſte. It imparts its ſmell to water diſtilled from it, and moſt of its properties may be imparted to alcohol. Valerian grows commonly in Britain, and the beſt is that which grows in high, dry ſituations. The roots ſhould be taken up in autumn or winter.

Valerian is a valuable antiſpaſmodic, and is properly ranked [illegible] that claſs of remedies. It has been found effectual in epilepſy, in which it ſhould be given in [illegible], in [illegible], to the

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extent of a dram or two ſeveral times a day. It is uſeful in hyſteria, and in caſes of great nervous ſenſibility. It is ſometimes united with cinchona in the form of an electuary. The uſual doſe is from 15 to 30 grains. Its unpleaſant flavour is moſt effectually concealed by the addition of a little mace.

Officinal Preparations.

355 Tincture of valerian.

a. Tinctura Valeriani, L. Tincture of valerian.

This is made by digeſting four ounces of valerian root in coarſe powder in two pints of proof ſpirit for eight days, with a gentle heat.

This tincture is given in the ſame caſes in which valerian is uſeful in ſubſtance, in a doſe of from two to four drams; but it is not ſo efficacious as the powder, or the following tincture.

b. Tinctura Valeriani ammoniata, L. D. Ammoniated tincture of valerian.

Made by digeſting for eight days, in a cloſely covered veſſel, four ounces of powdered valerian root in two pints of compound ſpirit of ammonia.

This is perhaps the beſt form in which valerian can be given, as its antiſpaſmodic virtues are much improved by the addition of ammonia. Doſe a dram or two, which is beſt taken in water a little warmed.

356 Reſinous extract of wild valerian.

c. Extractum Valeriani Sylvestris Resinosum, D. Reſinous extract of wild valerian.

This extract is made by digeſting for four days a pound of powdered valerian in four pounds of rectified ſpirit of wine; then pouring off the tincture, and boiling the reſiduum in 12 pounds of water to two pounds. The two liquors are to be ſtrained ſeparately; the decoction is to be boiled, and the tincture diſtilled, till both are ſufficiently thick, and they are then to be mixed together.

Of the effects of this extract we have had no experience; but we believe an extract made by inſpiſſating the ammoniated tincture, has been given with ſucceſs in the form of pills.

357 Saffron.

49. Crocus Sativus, E. CROCUS, L. D. Saffron.

Saffron is made from the ſtigmata of the above ſpecies of the crocus, which is cultivated for that purpoſe in ſome parts of England, eſpecially in Eſſex. Saffron is alſo brought from abroad, but that of our own produce is conſidered as the beſt. See Botany, p. 100.

Officinal Preparations.

358 Syrup of ſaffron.

a. Syrupus Croci, L. Syrup of ſaffron.

This is made by infuſing an ounce of ſaffron in a pint of boiling diſtilled water for 12 hours, and boiling the ſtrained infuſion with a ſufficient quantity of double refined ſugar to form a ſyrup.

Syrup of ſaffron is uſed chiefly as a pleaſant addition to draughts and juleps, to which it imparts a fine yellow colour.

359 Tincture of ſaffron.

b. Tinctura Croci, E. Tincture of ſaffron.

Made by digeſting an ounce of Engliſh ſaffron cut into threads, in 15 ounces of diluted alcohol for ſeven days, and ſtraining the tincture.

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By ſome practitioners this is conſidered as a good remedy in chronic weakneſs, and is given in the doſe of a table ſpoonful undiluted, every morning.

360 Florentine orris.

50. Iris Florentina, E. IRIS, L. Florentine orris.

This is brought from Italy in white, flattiſh, knotty pieces, that are very difficult to break or powder. It has an agreeable fragrant ſmell, and a ſlightly bitter taſte. It is employed chiefly as a perfume.

361 Water flag.

51. Iris Pseudacorus. IRIS, D. Water flag. See Botany, p. 100.

Order 2. Digynia.

362 Sugar.

363 Refined ſugar.

52. Saccharum Officinarum. Sugar. SACCHARUM NON PURIFICATUM, E. L. SACCHARUM RUBRUM, D. Brown ſugar. SACCHARUM PURIFICATUM, L. D. SACCHARUM PURISSIMUM, E. Refined ſugar.

On the chemical properties of ſugar, ſee Chemistry. Brown ſugar is ſometimes employed as a gentle laxative, eſpecially in clyſters. Refined ſugar is uſed chiefly in making ſyrups and conſerves, and in giving an agreeable taſte.

Officinal Preparation.

364 Simple ſyrup.

a. Syrupus simplex, E. Simple ſyrup.

Made by diſſolving 15 parts of double refined ſugar in 8 of water, by a gentle heat.

365 Oats.

53. Avena sativa, E. AVENA, L. Oats.

Oats are employed in medicine chiefly to form gruel, which is made either from groats or oatmeal, and is an uſeful diluent in febrile and inflammatory affections, and is alſo uſed in clyſters as an emollient. Poultices are ſometimes made of oatmeal, mixed with other ſubſtances according to the nature of the caſe.

366 Common wheat.

367 Starch.

54. Triticum { Æstivum, D. Hibernum, L. } Common wheat. FARINA. *Flour.* AMYLUM. *Starch.*

Flour and ſtarch are ſometimes uſed as emollients, eſpecially the latter, in the form of clyſters or troches, in caſes of diarrhœa, dyſentery, &c.

Officinal Preparations.

368 Mucilage of ſtarch.

a. Mucilago Amyli, E. L. Mucilage of ſtarch.

Made by triturating half an ounce of ſtarch with one pound of water, and then boiling the liquor till it be ſufficiently thick.

369 Troches of ſtarch.

b. Trochisci Amyli, L. Troches of ſtarch.

Compoſed of an ounce and half of ſtarch, ſix drams of extract of liquorice, half an ounce of powdered Florentine orris root, and one pound and a half of double refined ſugar, made into a maſs for troches, with mucilage of gum tragacanth.

Theſe troches are employed as demulcents, to allay the irritation of tickling coughs.

55. Hordeum

370 Common barley. 55. Hordeum distichon, E. D. HORDEUM, L. Common barley.

Common barley freed from the huſks, and formed into what is called *pearl barley*, is uſed in medicine as an emollient in the form of decoction, or barley water.

Officinal Preparations.

371 Decoction of barley. *a.* Decoctum Hordei distichi, E. DECOCTUM HORDEI, L. Decoction of barley.

The making of barley water requires more nicety than is uſually ſuppoſed. The following is the method directed in the Edinburgh Pharmacopœia.

Take of pearl barley two ounces; water five pounds.

Firſt waſh off the mealy part which adheres to the barley with ſome cold water; then extract the colouring matter by boiling it a little with about half a pound of water. Throw this decoction away, and put the barley thus purified into five pounds of boiling water, which is to be boiled down to one half, and ſtrain the decoction.

372 Compound decoction of barley. *b.* Decoctum Hordei compositum, L. Compound decoction of barley.

Made by boiling two pints of the decoction of barley, two ounces of ſliced figs, half an ounce of liquorice root ſliced and bruiſed, two ounces of ſtoned raiſins, in one pint of diſtilled water, boiled to two pints and ſtrained.

Theſe decoctions may be uſed as common drink, in pneumonia, and ſimilar affections of the breaſt.

Class IV. TETRANDRIA. Order i. Monogynia.

373 Sarcocol. 56. Penæa sarcocolla. SARCOCOLLA, L. Sarcocol. See Chemistry, N° 2493.

374 Madder root. 57. Rubia tinctorum, E. RUBIA, L. D. Madder root.

This root has been long reputed a ſpecific in uterine obſtructions, but we believe without any good foundation. It is recommended in the atrophy of children, given in ſubſtance, in doſes of a ſcruple or half a dram ſeveral times a-day. Its property of tinging the bones of animals has been already mentioned.

375 Contrayerva. 58. Dorstenia contrajerva, E. CONTRAYERVA, L. Contrayerva root.

The root of this plant is knotty, an inch or two long, about half an inch thick, of a reddiſh brown colour externally, and pale within. From all ſides of it there ſhoot out long, rough, ſlender fibres, generally loaded with knots. It has a peculiar kind of aromatic ſmell, and its taſte is ſomewhat aſtringent and bitteriſh, with a light ſweetiſh kind of acrimony, when chewed for a conſiderable time. The fibres have little or no taſte or ſmell, therefore the tuberous parts alone ſhould be choſen.

This plant is perennial, and grows in South America and ſome of the Caribbee iſlands.

Contrayerva has been employed as a ſtimulant diaphoretic, in typhus fever, given in ſubſtance, in a doſe of from 30 to 40 grains; and a decoction of it, uſed as a gargle, has been recommended in putrid ſore throat.

Officinal Preparation.

376 Compound powder of contrayerva. *a.* Pulvis Contrayervæ compositus, L. Compound powder of contrayerva.

This is made by mixing together five ounces of powdered contrayerva, and one pound and a half of powder of crabs claws. Doſe about a dram, repeated every three or four hours.

Class V. PENTANDRIA. Order i. Monogynia.

377 Alkanet root. 59. Anchusa tinctoria, E. ANCHUSA, D. Alkanet root.

This root is employed merely to give colour to an ointment.

378 Carolina pink root. 60. Spigelia marylandica, E. SPIGELIA, L. D. Carolina pink root.

From 10 to 20 grains of the root of this plant have been given twice a day to children between 2 and 12 years of age, when troubled with worms. It generally operates as a purgative; but when it does not produce this effect in a ſufficient degree, proper doſes of rhubarb, jalap, or calomel, ſhould be given with it. As the ſpigelia may be eaſily overdoſed, and in that caſe produces alarming ſymptoms, it ſhould perhaps be eraſed from the catalogue of vermifuge medicines, of which there is a ſufficient number without it, that are at leaſt equally efficacious, and much ſafer in their operation.

379 Marſh trefoil. 61. Menyanthes trifoliata, E. TRIFOLIUM PALUDOSUM, L. D. Marſh trefoil.

This plant operates by purging and vomiting, in a doſe of a dram. It has been recommended in fevers and intermittents, but is ſeldom employed.

380 Scammony. 62. Convolvulus scammonia, E. SCAMMONIUM, L. D. Scammony.

This is a gum reſin which is brought from Syria, Myſia and Cappadocia. The roots of this plant, which are very long and thick, when freſh contain a milky juice. To obtain this, the earth is removed from the upper part of the roots, and the tops of theſe are cut obliquely off. The milky juice which flows out, is collected in a ſmall veſſel ſunk in the earth at the lower end of the cut. Each root furniſhes only a few drams, but it is collected from ſeveral veſſels, and dried in the ſun. This is the true and unadulterated ſcammony. It is light, of a dark gray colour, but becomes of a whitiſh yellow when touched with the wet finger, is ſhining in its fracture, has a peculiar nauſeous ſmell, and bitter acrid taſte, and forms with water a greeniſh milky fluid, without any remarkable ſediment. In this ſtate of purity it ſeldom reaches us, but is commonly mixed with the expreſſed juice of the root, and even of the ſtalks and leaves, and often with flour, ſand, or earth. The beſt to be met with in the ſhops comes from Aleppo, in light ſpongy maſſes, having a heavy diſagreeable ſmell; friable, and eaſily powdered; of a ſhining aſh colour, verging to black, when powdered of a light gray or whitiſh colour. An inferior ſort is brought from Smyrna in more compact ponderous pieces, not ſo friable, with leſs ſmell, and leſs eaſily powdered, of a darker colour, not ſo reſinous, and full of ſand and other impurities *. See CHEMISTRY, Nº 2458.

Scammony is one of the moſt draſtic purgatives, and as ſuch is ſometimes given in dropſy, in a doſe of from 5 to 15 grains. It is alſo one of the moſt common anthelmintics; but in this latter caſe is generally combined with a mercurial.

Officinal Preparations.

a. PULVIS SCAMMONIÆ COMPOSITUS, L. E. D. Compound powder of ſcammony.

The London powder is compoſed of ſcammony, hard extract of jalap, of each two ounces; ginger, half an ounce: powdered ſeparately, and then mixed together.

This powder in the Edinburgh Pharmacopœia is directed to be compoſed of ſcammony, ſupertartrite of potaſh, equal parts rubbed together to a fine powder. The Dublin formula directs of ſcammony and vitriolated vegetable alkali, each two ounces, and ginger half an ounce, powdered ſeparately, and then mixed together.

As the ſtrength of theſe powders is different, their doſes muſt vary: from 10 to 30 grains of the Edinburgh powder, and from 8 to 15 of the others, may be given for a doſe.

382 Compound powder of ſcammony with aloes.

b. PULVIS SCAMMONII COMPOSITUS CUM ALOE, L. Compound powder of ſcammony with aloes.

This is compoſed of ſix drams of ſcammony, hard extract of jalap, ſocotorine aloes, of each one ounce and a half, of ginger half an ounce, powdered ſeparately and mixed together.

Doſe from 5 to 15 grains.

383 Powder of ſcammony with calomel.

c. PULVIS SCAMMONII CUM CALOMELANE, L. Powder of ſcammony with calomel.

This is compoſed of ſcammony half an ounce, calomel, double refined ſugar, of each two drams, powdered ſeparately and then mixed together.

This is well ſuited to caſes of worms, and may be given from 12 to 20 grains.

384 Electuary of ſcammony.

d. ELECTUARIUM SCAMMONII, L. D. Electuary of ſcammony.

Prepared of an ounce and a half of powdered ſcammony, cloves, ginger, of each ſix drams, eſſential oil of caraway half a dram, and ſyrup of roſes or orange peel, a ſufficient quantity to form an electuary.

A briſk warm purgative, doſe from 15 to 30 grains.

385 Jalap.

63. CONVOLVULUS JALAPA, E. JALAPIUM, L. JALAPA, D. Jalap root.

The botanical and medical hiſtory of this ſimple has been already ſufficiently detailed under the article BOTANY, p. 132. It remains here only to notice the

Officinal Preparations.

386 Compoun powder o jalap.

a. PULVIS JALAPÆ COMPOSITUS, E. Compound powder of jalap.

This is prepared by grinding together one part of powdered jalap and two parts of ſupertartrate of potaſh into a fine powder.

The ſupertartrate of potaſh in this preparation is uſeful chiefly for aſſiſting in reducing the jalap to a finer powder, and thus rendering its operation milder. Doſe from half a dram to one dram.

387 Extract o jalap.

b. EXTRACTUM CONVOLVULI JALAPÆ, E. EXTRACTUM JALAPII, L. EXTRACTUM JALAPÆ, D. Extract of jalap.

This extract, according to the Edinburgh proceſs, is made by digeſting one pound of powdered jalap in four pounds of alcohol for four days, pouring off the liquor, and boiling the reſiduum for 15 minutes in five pounds of diſtilled water, filtering the decoction while boiling hot through linen. This decoction is to be repeated with the ſame quantity of water, and both decoctions, when filtered, are to be boiled to the conſiſtency of honey. In the mean time the ſpirit is to be drawn off from the tincture by diſtillation, till this alſo becomes thick, when it is to be mixed with the watery extract, and both evaporated in a bath of boiling water ſaturated with muriate of ſoda, till there is formed a maſs of a proper conſiſtence for making pills.

This extract is a powerful purgative; it may be given in a doſe of from 5 to 15 grains.

388 Tincture o jalap.

c. TINCTURA CONVOLVULI JALAPÆ, E. TINCTURA JALAPII, L. TINCTURA JALAPÆ, D. Tincture of jalap.

This tincture is made by digeſting three ounces (according to the Edinburgh college) or eight ounces according to the colleges of London and Dublin, of powdered jalap, in 15 ounces (or two pints London, or two pounds Dublin), of diluted alcohol, for ſeven or eight days, and ſtraining the liquor through paper.

The doſe of the Edinburgh tincture may be from three to ſix drams; that of the others from two to four drams.

389 Thorn apple.

64. DATURA STRAMONIUM, E. STRAMONIUM. Thorn apple. See BOTANY, p. 137.

390 Black henbane.

65. HYOSCYAMUS NIGER, E. HYOSCYAMUS, D. Black henbane.

This plant grows commonly on dunghills and uncultivated places in ſeveral parts of Britain. It produces large, dark-coloured, woolly, jagged leaves, of a very ſtrong and peculiar ſmell, ſparkling when burnt, as if impregnated with nitre. Theſe leaves are the principal part employed in medicine, acting as a narcotic. The ſeeds are alſo employed, and when ſmoked like tobacco, are ſaid to be an excellent remedy in toothach.

Wherever an anodyne is wanted, and opium diſagrees, this herb, and the preparations from it, may be preſcribed. It is eſpecially ſuited to ſpaſmodic and colic affections, and to caſes of chronic rheumatiſm and arthritis.

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* D. D[illegible]

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arthritis. Inſtances are alſo recorded of its beneficial effects in mania and melancholy; but in the laſt-mentioned diſorders, it has at leaſt as often failed as it has ſucceeded, and is, on the whole, a doubtful remedy in diſeaſes belonging to the order of veſaniæ. It does not occaſion coſtiveneſs like opium, and forms one of the beſt ſubſtitutes for this expenſive narcotic. Given in large doſes, it produces great debility, delirium, remarkable dilatation of the pupils of the eyes, convulſions, and death. It is uſually given in the form of extract, but the leaves are ſometimes applied freſh by way of cataplaſm to ſchirrous tumors and cancerous ulcers.

Officinal Preparations.

391 *a.* SUCCUS SPISSATUS HYOSCYAMI NIGRI, E. Inſpiſſated juice of henbane.

This is made by bruiſing the freſh leaves, and putting them into a hempen bag, in which they are ſtrongly compreſſed till the juice is extracted. This is evaporated in flat veſſels heated with boiling water, ſaturated with muriate of ſoda, till it becomes of the conſiſtence of thick honey; and after the maſs has become cold, it is put into glazed earthen veſſels ſprinkled with alcohol, and cloſely covered.

Doſe from two grains to 15 or 20, on extraordinary occaſions; but if theſe large doſes occaſion unpleaſant effects, as headach, vertigo, vomiting, or purging, the medicine muſt be diſcontinued.

392 *b.* TINCTURA HYOSCYAMI NIGRI, E. Tincture of henbane.

Made by digeſting one ounce of the dried leaves of henbane in eight ounces of diluted alcohol for ſeven days, and ſtraining. Doſe from half a dram to a dram.

393 66. NICOTIANA TABACUM, E. NICOTIANA, L. D. Tobacco leaves. See BOTANY, p. 157.

Beſides its ordinary narcotic virtues, the ſmoke of tobacco thrown up the bowels by way of clyſter, has proved an effectual remedy in obſtinate colic.

Officinal Preparation.

394 *a.* VINUM NICOTIANÆ TABACI, E. Tobacco wine.

Made by macerating one ounce of the dried leaves of tobacco in one pound of Spaniſh white wine for ſeven days, and ſtraining the liquor.

This has been ſometimes employed as a diuretic. Doſe from 30 to 60 drops.

395 67. CHIRONIA CENTAURIUM, E. CENTAURIUM MINUS, L. D. Leſſer centaury.

A ſtrong bitter, ſometimes employed as a tonic in the form of an infuſion of the tops.

396 68. STRYCHNOS NUX VOMICA. Nux vomica. The kernel.

The taſte of this kernel is extremely bitter; it has little or no ſmell, and is ſo hard, that it cannot be reduced into powder by beating.

This nut is a very powerful narcotic, inducing even death by its ſedative power, as, on diſſection, no marks of inflammation, or local affection, are to be diſcovered in the ſtomach.

As a narcotic, it has ſcarcely been uſed, though it has been recommended in mania, epilepſy, hyſteria, &c. It has been given in dyſentery and intermittent fever, in a doſe of five grains twice a day; but it does not poſſeſs any ſuperior medicinal powers *.

397 Cayenne pepper. 69. CAPSICUM ANNUUM, E. PIPER INDICUM, L. D. Capſicum. Indian or Cayenne pepper. See BOTANY, p. 138.

It has been given with manifeſt advantage in caſes of gouty dyſpepſia, in ſome hydropic affections joined with paralytic ſymptoms, and in the advanced and ſinking ſtage of typhus and the malignant endemic fever of the Weſt Indies; alſo in the malignant ſore throat, in which it has a good effect, both when taken into the ſtomach, and when uſed as a gargle. Bergius relates, that he preſcribed the ſeeds with ſucceſs in obſtinate agues. Of the dried and pulverized capſules, the doſe, internally, is from one to three grains. In the advanced ſtage of the yellow fever, double the laſt mentioned quantity has been given at a time. The gargle is prepared by macerating the powder firſt in warm vinegar, and afterwards adding a proper quantity of hot water, and continuing the maceration for a ſufficient length of time. The proportions, two drams of the capſicum to half a pound of each menſtruum *.

398 Bitter ſweet. 70 SOLANUM DULCAMARA. DULCAMARA, D. Bitter ſweet. See BOTANY, p. 138.

399 Deadly nightſhade. 71. ATROPA BELLADONNA, E. BELLADONNA, D. Deadly nightſhade. See BOTANY, p. 138.

The whole plant is poiſonous, and the berries, from their beautiful appearance, have ſometimes proved fatal to children. The ſymptoms excited are, a dryneſs of the mouth, a trembling of the tongue, a very diſtreſſing thirſt, a difficulty of ſwallowing, fruitleſs efforts to vomit, and great anxiety about the præcordia. Delirium then comes on, with gnaſhing of the teeth, and convulſions. The pupil remains dilated, and is not ſenſible even to the ſtimulus of light. The face becomes tumid, and of a dark red colour. The jaws are frequently locked. Inflammation attacks the œſophagus, ſtomach, and inteſtines, ſometimes extending to the meſentery, lungs, and liver, accompanied with violent pains in the abdomen. The ſtomach is very inſenſible to ſtimulus, and the periſtaltic motion of the inteſtines is deſtroyed. General relaxation, palſy, eſpecially of of the lower extremities, convulſions, vertigo, blindneſs, coma, and death ſucceed. The body ſoon putrifies, ſwells, and becomes marked with livid ſpots; blood flows from the noſe, mouth, and ears, and the ſtench is inſufferable. On diſſection the blood is found to be fluid, the inteſtines are inflated and inflamed, or eroded and gangrenous. The beſt method of cure is to excite vomiting as ſoon as poſſible, by emetics, and tickling the fauces; to evacuate the bowels by purgatives and clyſters, and to give largely, vinegar, honey, milk and oil. In ſome children who recovered by this treatment, the delirium was ſucceeded by a profound ſopor, accompanied with ſubſultus tendinum; the face and hands became pale and cold, and the pulſe ſmall, hard, and quick. Their recovery was ſlow, and the blindneſs continued a conſiderable time, but at laſt went off *.

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* *Murray's Elements*, vol. i.

* *Practical Synopſis*, vol. ii.

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A medicine capable of producing ſuch powerful effects, demands the utmoſt caution on the part of the preſcriber. He ſhould begin with the ſmalleſt doſes, increaſing them very gradually to a double, triple, or quadruple quantity (in which caſes the intervals between the repetitions of the doſes ſhould be proportionably lengthened), and deſiſting as ſoon as a dryneſs or ſtricture of the throat, or much diarrhœa, or great languor, with ſickneſs and vomiting, or vertigo, and dimneſs of ſight, come on.

It is beſt employed in ſubſtance, beginning with a grain for adults, and an eighth or a fourth of a grain for children.

It has been employed in a great variety of caſes, as, 1. In ſeveral febrile diſeaſes; in obſtinate intermittents; and in the plague. 2. In inflammations; the gout. 3. In comatoſe diſeaſes; in palſy, and loſs of ſpeech from apoplexy. 4. In ſpaſmodic diſeaſes; in chorea, epilepſy, chincough, hydrophobia, melancholy, and mania. 5. In cachectic affections; in dropſies, and obſtinate jaundice. 6. In local diſeaſes; in amauroſis, ophthalmia, in ſchirrhus, and cancer.

Officinal Preparations.

400 Inſpiſſated juice of deadly nightſhade.

a. Succus spissatus Atropæ Belladonnæ, E. Inſpiſſated juice of deadly nightſhade.

This is made in the ſame way as the inſpiſſated juice of henbane. See N° 391. Doſe from one to five grains.

401 Cinchona bark.

72. Cinchona officinalis, E. CINCHONA, L. CORTEX PERUVIANUS. Cinchona bark. *Peruvian bark. Jeſuits bark.*

The account of this valuable remedy already given under Botany, p. 133. and the article Cinchona, has been ſo ample, that we ſhall add nothing to it in this place, but ſhall immediately proceed to notice the officinal preparations, referring our readers for further information on the ſimple, to Percival's eſſays, the Synopſis Materiæ Medicæ, the Theſaurus Medicaminum, and Dr Duncan's Diſpenſatory.

Officinal Preparations.

402 Infuſion of cinchona bark.

a. Infusum Cinchonæ officinalis, E. Infuſion of cinchona bark.

This is made by infuſing an ounce of powdered cinchona bark in a pound of water for 24 hours, and filtering.

Doſe from two to four ounces.

b. Decoctum Cinchonæ officinalis, E. DECOCTUM CORTICIS PERUVIANI, L. D. Decoction of cinchona bark.

Prepared by boiling an ounce of powdered cinchona bark in about a pound and a half of water for 10 minutes, and ſtraining the liquor while hot.

This is ſcarcely ſo good a preparation as the infuſion. The ordinary doſe is three or four ounces.

403 Tincture of cinchona bark.

c. Tinctura Cinchonæ officinalis, E. TINCTURA CORTICIS PERUVIANI, L. D. Tincture of cinchona bark.

Made by digeſting four or ſix ounces of powdered cinchona bark in about two or two pounds and a half of diluted alcohol for ſeven or eight days, and ſtraining the liquor through paper.

This is ſeldom given by itſelf, being generally added to the decoction or infuſion. Doſe three or four drams to an ounce.

d. Tinctura Cinchonæ composita, L. D. Compound tincture of cinchona bark. ***Huxham's tincture of bark.***

This is a very aromatic tincture of bark, made by digeſting two ounces of powdered cinchona, from half an ounce to an ounce and a half of dried Seville orange peel, three drams bruiſed Virginian ſnake root, a dram of ſaffron, and two ſcruples of powdered cochineal, in 20 ounces or two pounds of proof ſpirit for 14 days, and ſtraining.

Doſe two or three drams.

404 Ammoniated tincture of cinchona.

e. Tinctura Cinchonæ ammoniata, L. Ammoniated tincture of cinchona.

Made by digeſting four ounces of powdered cinchona in two pints of compound ſpirit of ammonia for 10 days in a cloſe veſſel.

As a preparation of cinchona bark, this is uſeleſs, and as a ſtimulus it is not preferable to the compound ſpirit of ammonia by itſelf.

405 Extract of cinchona bark.

f. Extractum Cinchonæ officinalis, E. Extract of cinchona bark.

This is made in the ſame manner as extract of jalap, ſee N° 387.

g. Extractum Cinchonæ, L. Extract of bark.

The following is the proceſs of the London college for making this extract.

Take of Peruvian bark, in coarſe powder, one pound; diſtilled water, 12 pints. Boil for an hour or two, and pour off the liquor, which, while hot, will be red and pellucid, but, as it grows cold, will become yellow and turbid. The ſame quantity of water being again poured on, boil the bark as before, and repeat the boiling until the liquor, on becoming cold, remains clear. Then reduce all theſe liquors, mixed together and ſtrained, to a proper thickneſs by evaporation. This extract muſt be prepared under two forms; one *ſoft*, and fit for making pills, and the other *hard* and pulverizable.

The Dublin college gives ſeparate proceſſes for making their hard and ſoft extract of cinchona; but they do not materially differ from the above.

All theſe extracts may be given in the form of pills, in a doſe of from 10 to 20 grains, or by way of clyſter in the quantity of a dram or two.

406 Cinchon the Can beanisla

73. Cinchona Caribbæa, E. Cinchona of the Caribbean iſlands.

This is a ſpecies of cinchona introduced here by Dr Wright. In medical properties it reſembles the former, and may be ſubſtituted for it.

407 Blue ca nal flow

74. Lobelia syphilitica, E. Blue cardinal flower. See Botany, p. 133.

75.

408 Ipecacuan root. 75. Cephaelis ipecacuanha, E. IPECACUANHA, L. D. Ipecacuan root.

A pretty full account of ipecacuan has been already given in the article Botany, under *Pſychotria Emetica*, p. 135.

It appears that this drug, or ſomething very ſimilar to the common ipecacuan, is the produce of ſeveral vegetables, which are enumerated by Dr Duncan in his Diſpenſatory.

Ipecacuan is given as an emetic, in full doſes of a ſcruple or 25 grains; as an expectorant, in doſes of one grain, repeated every three or four hours; as a diaphoretic, given in combination with opium; and as antiſpaſmodic, given from three to ſix grains.

When properly adminiſtered, it proves ſerviceable in the following diſeaſes, viz. in intermittent fevers, a paroxyſm of which has often been arreſted by giving it as an emetic about an hour before the paroxyſm was expected to come on; in continued fevers, given at the commencement as an emetic, and followed by a diaphoretic regimen; in ſeveral inflammatory diſeaſes, as rheumatiſm, given as a diaphoretic; in pneumonia, exhibited to excite and keep up nauſea without vomiting; in dyſentery, in which it was formerly deemed a ſpecific; in exanthematous diſeaſes, eſpecially where the eruption is diſpoſed to recede; in hemorrhages, given in nauſeating doſes; in ſeveral ſpaſmodic affections, as epilepſy, aſthma, dyſpnœa, chincough, chronic diarrhœa, hyſteria; in mental alienation, as *melancholia* and *mania*, given in large doſes; in ſome kinds of dropſy; in jaundice; in amauroſis.

Ipecacuan is beſt exhibited in ſubſtance; but it is often given in the form of a vinous infuſion.

Officinal Preparations.

409 Ipecacuan wine. *a.* Vinum Ipecacuanhæ. Wine of ipecacuan.

This is made by digeſting two ounces of bruiſed ipecacuan root in about two pounds of Spaniſh white wine, for about a week, and ſtraining.

This preparation being more palatable than the ipecacuan in ſubſtance, is well ſuited to delicate and ſqueamiſh patients. It may be given from an ounce to two ounces.

410 Powdered ipecacuan and opium. *b.* Pulvis Ipecacuanhæ et Opii, E. PULVIS IPECACUANHÆ COMPOSITUS, L. D. PULVIS DOVERI. Powder of ipecacuan and opium. *Compound powder of ipecacuan. Dover's powder.*

This powder is prepared by triturating eight parts of cryſtallized ſulphate of potaſh, with one part of hard dry opium, and one part of powdered ipecacuan, till they are reduced to a very fine powder.

The cryſtallized ſalt in this proceſs ſerves the purpoſe of reducing the opium and ipecacuan to a ſtate of very minute diviſion, and thus renders them more effectual. This is a valuable diaphoretic, and may be given from 10 to 20 grains; but where a long continued ſweat is deſired to be kept up, it is better to give 10 or 15 grains at firſt, and 10 or 5 grains more a few hours after.

411 Buckthorn. 76. Rhamnus catharticus, E. SPINA CERVINA, L. Buckthorn. See Botany, p. 139.

Officinal Preparation.

412 Syrup of buckthorn. *a.* Syrupus Rhamni cathartici, E. SYRUPUS SPINÆ CERVINÆ, L. Syrup of buckthorn.

The Edinburgh college directs this to be made with two parts of the depurated juice of ripe buckthorn berries, and one part of double refined ſugar, boiled to the conſiſtence of a ſyrup. The London proceſs is more complex. It directs a gallon of the freſh juice of ripe buckthorn berries, an ounce of bruiſed ginger, an ounce and a half of powdered pimento, and ſeven pounds of double refined ſugar. The juice is to be ſet aſide for three days, and then ſtrained from the fæces. The ginger and pimento are to be macerated for four hours in a pint of the ſtrained liquor. In the mean time the reſt of the juice is to be boiled down to three pints; then the ſugar and the pint of juice in which the ſpices had been macerated, are to be added, and the whole boiled to the conſiſtence of a ſyrup.

This ſyrup is a good cathartic, but is ſeldom given alone, except to children. Doſe from ſix drams to an ounce and a half.

413 Wine. 77. Vitis vinifera, E. The vine.

The remedies drawn from the vine are wine, grapes, and ſupertartrate of potaſh.

The properties of wine as a ſtimulant and cordial, have been already mentioned. See N° 100. The wines uſually employed in medicine are,

Vinum album hiſpanum, *white Spaniſh wine.*
Vinum album rhenanum, *Rheniſh wine.*
Vinum rubrum luſitanum, *red Port wine.*

The laſt, beſides the ſtimulating power common to all wines, poſſeſſes much aſtringency, and is therefore better ſuited to caſes of debility.

414 Raiſins. 78. UVÆ PASSÆ. Raiſins.

Theſe are chiefly employed as emollients and demulcents.

415 Supertartrate of potaſh. 79. Supertartras Potassæ. SUPERTARTRIS POTASSÆ. TARTARI CRYSTALLI, L. D. CREMOR TARTARI. Supertartrate of potaſh. *Cryſtals of tartar. Cream of tartar.*

For the chemical nature of this ſalt, ſee Chemistry.

This ſalt is employed in medicine chiefly as a gentle laxative and refrigerant. As a laxative, it may be given in the doſe of from two drams to half an ounce, mixed with ſyrup or honey, or diſſolved in a large quantity of barley water. In the latter way it has been found a good diuretic in dropſies. As a refrigerant, it is given in a diluted ſolution, ſweetened with ſugar, or ſome pleaſant ſyrup.

Officinal Preparations.

416 Tartrate of potaſh. *a.* Tartras Potassæ. TARTRIS POTASSÆ, E. KALI TARTARISATUM, L. ALKALI VEGETABILE TARTARISATUM, D. Tartrate of potaſh. *Tartariſed kali. Tartariſed vegetable alkali. Soluble tartar.*

This ſalt is prepared by adding to a ſolution of ſupertartrate of potaſh, a ſufficient quantity of ſub-carbonate

nate of potaſh, to neutralize the exceſs of tartaric acid. For this purpoſe it uſually requires about one part of the alkaline carbonate to three parts of ſupertartrate of potaſh. After neutralization, the liquor is filtered, and ſet by to cryſtallize.

This ſalt forms an excellent cooling purgative, and may be given in doſes of from half an ounce to an ounce. It forms a good addition to rhubarb.

417 Tartrate of potaſh and ſoda.

b. TARTRAS POTASSÆ ET SODÆ. TARTRIS POTASSÆ ET SODÆ, E. NATRON TARTARISATUM, L. SAL RUPELLENSIS, D. Tartrate of potaſh and ſoda. *Tartarized natron. Rochelle ſalt.*

Prepared by adding to a ſolution of ſupertartrate of potaſh, a ſufficient quantity of carbonate of ſoda, to neutralize the exceſs of tartaric acid, filtering the liquor, and cryſtallizing.

This triple ſalt is a more agreeable laxative than the former, but is not ſo ſtrong. Uſual doſe from one to two ounces.

418 Pureſt ſubcarbonate of potaſh.

c. SUBCARBONAS POTASSÆ PURISSIMUS. CARBONAS POTASSÆ PURISSIMUS, E. SAL TARTARI. Pureſt ſubcarbonate of potaſh. *Salt of tartar.*

Prepared by burning all the tartaric acid from *tartar*, ſolution in water, filtration and cryſtallization.— Similar in its uſes with N° 313. which ſee.

419 Sweet violet.

80. VIOLA ODORATA, E. VIOLA, L. D. Sweet violet. See BOTANY, p. 141.

Officinal Preparations.

420 Syrup of violets.

a. SYRUPUS VIOLÆ ODORATÆ, E. SYRUPUS VIOLÆ, L. D. Syrup of violets.

Made by macerating one pound or two pounds (L. D.) of the freſh petals of violets, in four pounds or five pints (L.) or ſix pounds (D.) of boiling water for 24 hours, ſtraining the liquor without expreſſion, and boiling it with a ſufficient quantity of double refined ſugar, to make a ſyrup.

A gentle laxative for young children.

421 Red currants.

81. RIBES RUBRUM. Red currants.

The fruit of red currants is uſed as a refrigerant in febrile affections.

422 Black currants.

82. RIBES NIGRUM. Black currants.

Alſo employed as a refrigerant: and the following preparations form a good domeſtic palliative in inflammatory affections of the throat, and in tickling coughs.

Officinal Preparations.

423 Inſpiſſated juice of black currants.

a. SUCCUS SPISSATUS RIBIS NIGRI. Inſpiſſated juice of black currants.

This is made by expreſſing and clarifying the juice of ripe black currants, and then evaporating it in a bath of water with muriate of ſoda, to a proper conſiſtence.

424 Syrup of black currants.

b. SYRUPUS RIBIS NIGRI. Syrup of black currants.

Prepared by boiling the depurated juice of black currants with a ſufficient quantity of ſugar to make a ſyrup.

Order 2. DIGYNIA.

425 Gentian.

83. GENTIANA LUTEA, E. GENTIANA, L. D. Gentian root.

The root of gentian is moderately long, ſlender, branched, browniſh on the outſide, of a reddiſh yellow or gold colour within. It is perennial, a native of the mountainous parts of Germany, &c. whence the ſhops are generally ſupplied with the dried roots.

Among the gentian brought to London, ſome years ago, a root of a different kind was mixed, the uſe of which occaſioned violent diſorders, and in ſome inſtances, as is ſaid, proved fatal. This root is externally of a paler colour than gentian, and its longitudinal wrinkles finer and cloſer; on cutting the two roots, the difference is more remarkable, the poiſonous root being white, without any degree of the yellow tinge which is deep in gentian, nor is its taſte bitter, like that of gentian, but mucilaginous.

Gentian root is a ſtrong flavourleſs bitter; in taſte leſs exceptionable than moſt of the other common ſtrong bitters, and hence among us moſt generally made uſe of. The flavour and aromatic warmth wanting to render it grateful, and acceptable to the ſtomach, are ſupplied by additions.

The root of this plant is a valuable ſubſtance, very ſucceſsfully and very generally employed as a ſtomachic and ſtrengthening medicine. It is particularly uſeful in various chronic affections connected with debility, ſuch as dyſpepſia, diarrhœa, hyſteria, chloroſis, dropſy. It has alſo been given with good effect in intermittent fevers, joined with the peruvian bark; and in convaleſcencies from all fevers. In theſe and other caſes it is combined with aromatics and chalybeates; ſometimes with acids; at other times with alkaline ſalts, eſpecially in dyſpeptic and chlorotic affections, as alſo in certain diſorders of the bowels; with abſorbents and aromatics in caſes of gout.

The uſe of this bitter, like that of many others, muſt not, however, be carried too far, as by weakening the energy of the nervous ſyſtem, it prediſpoſes to palſy and apoplexy.

Officinal Preparations.

426 Compound infuſion of gentian.

a. INFUSUM GENTIANÆ COMPOSITUM, E. L. D. INFUSUM AMARUM. Compound infuſion of gentian. *Bitter infuſion.*

The Edinburgh infuſion is made by ſteeping half an ounce of ſliced gentian root, one dram dried peel of Seville oranges, half a dram of coriander ſeeds bruiſed, firſt in four ounces of diluted alcohol for three hours, and then adding one pound of water; macerating without heat for twelve hours, and then ſtraining.

This infuſion, according to the London Pharmacopœia, is made by macerating for an hour in boiling water, twelve ounces by meaſure, one dram of ſliced gentian root; one dram and a half dried orange peel, half an ounce of freſh outer rind of lemons. The Dublin formula directs two drams of bruiſed gentian root, half an ounce freſh outer rind of lemons, one dram and a half of dry orange peel, four ounces of diluted alcohol, and twelve ounces of boiling water; and the infuſion is to be made firſt by alcohol and afterwards with the addition of water, nearly as in the Edinburgh proceſs.

Theſe infuſions form a good tonic remedy in debility of the alimentary canal. A glaſs of them may be given twice or thrice a day, either alone, or with the addition of ſome aromatic tonic tincture.

427 Compound tincture of gentian.

b. Tinctura Gentianæ composita, E. L. TINCTURA AMARA. ELIXIR STOMACHICUM. Compound tincture of gentian. *Bitter tincture. Stomachic elixir.*

The Edinburgh tincture is prepared by macerating two ounces of ſliced and bruiſed gentian root, an ounce of dried and bruiſed Seville orange peel, half an ounce of bruiſed canella alba, and half a dram of powdered cochineal, in two pounds and a half of diluted alcohol for ſeven days. The tincture of the London college is made with two ounces of ſliced and bruiſed gentian, one ounce of dried orange peel, half an ounce leſſer cardamom ſeeds, huſked and bruiſed, digeſted for eight days in two pints of proof ſpirit.

Theſe tinctures are ſeldom given alone, but may be adminiſtered in a doſe of two or three drams in a glaſs of water.

428 Compound wine of gentian.

c. Vinum Gentianæ compositum, E. VINUM AMARUM. Compound wine of gentian. *Bitter wine.*

Prepared of half an ounce of gentian root, one ounce of cinchona bark, two drams of Seville dried orange peel, one dram of canella alba, four ounces diluted alcohol, two pounds and a half of Spaniſh white wine. The diluted alcohol is firſt poured on the root and bark ſliced and bruiſed, and after 24 hours adding the wine, then macerating for ſeven days and ſtraining. Doſe from two drams to half an ounce.

429 Extract of gentian.

d. Extractum Gentianæ luteæ, E. EXTRACTUM GENTIANÆ, L. D. Extract of gentian.

This is made by evaporating the ſaturated and ſtrained decoction of the root to a conſiſtence fit for being made into pills, under which form it is frequently preſcribed in all thoſe caſes in which the infuſion and tincture are employed. Doſe of this extract from ten grains to half a dram. It is ſeldom given alone, but generally in combination with aromatic and aloetic powders, with myrrh, ſulphurate of iron, &c.

430 Elm bark.

84. Ulmus campestris, E. ULMUS, L. D. Elm bark.

The inner bark of the elm is frequently employed in cutaneous eruptions, as an alterative, or gentle diaphoretic, in the form of decoction.

Officinal Preparation.

431 Decoction of elm bark.

a. Decoctum Ulmi, L. Decoction of elm bark.

Made by boiling four ounces of the freſh inner bark of elm bruiſed, in four pints of water to two, and ſtraining. Doſe about four ounces, repeated ſeveral times a-day.

This medicine probably does not deſerve the reputation it has acquired.

85. Eryngium maritimum. ERYNGIUM, L. D. Eryngo root. See Botany, p. 144. 432 Eryngo root.

86. Daucus carota, E. DAUCUS SYLVESTRIS, L. D. Wild carrot ſeed. 433 Carrot.

The ſeeds are ſometimes employed as a carminative, and have been recommended as a diuretic. They are ſeldom uſed.

The grated roots of cultivated carrot are frequently applied as a poultice to cancerous and ill-conditioned ulcers.

87. Conium maculatum, E. Cicuta, L. D. Hemlock. See Botany, p. 145. 434 Hemlock.

Hemlock has been employed chiefly in ſcrophulous and cancerous diſorders, both internally and externally, and in many of theſe caſes, with conſiderable benefit; in other inſtances, without any ſenſible relief, even after being continued for a great length of time. Like moſt propoſers of new remedies, *Stoerck* has been too profuſe in his encomiums on hemlock. It has been found uſeful in chronic rheumatiſm, and ſome caſes of gout, where opium diſagreed, and in that acutely painful complaint termed *tic douloureux*; as alſo in caries of the bones and bad venereal ulcerations. Dr Butter preſcribed it with marked ſucceſs in the hooping-cough; and being leſs ſtimulant than opium, and leſs liable to check expectoration, it generally anſwers better than the inſpiſſated juice of the poppy, in caſes of phthiſis pulmonalis. The dried leaves may be given alone in doſes of five to 15 grains. With the inſpiſſated juice and powder are joined, according to the nature of the diſorder in which they are given, calomel, guaiacum, ammoniacum, &c. In the adminiſtration of this, as of all other narcotic medicines, it is proper to begin with the ſmalleſt doſes, afterwards gradually increaſing them to as much as the patients can well bear. In this manner many inſtances are recorded where aſtoniſhing quantities of hemlock have been taken, in cancerous and other painful diſorders, without diſturbing the conſtitution. It is a ſign that the medicine has been puſhed to its utmoſt length, when it diſorders the head, ſtomach, or bowels. For external uſe, fomentations, cataplaſms, and plaſters, are prepared from this vegetable *.

Officinal Preparation.

435 Inspiſſated juice of hemlock.

a. Succus spissatus Conii maculati, E. SUCCUS SPISSATUS CICUTÆ, D. Inſpiſſated juice of hemlock.

This is made by expreſſing hemlock which is gathered when the flowers are beginning to appear, and allowing the juice to ſtand ſix hours until the feces ſubſide, then reducing the decanted juice to dryneſs in a water bath.

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* Pract. of Surgery, vol. ii.

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This extract may be given in a doſe of two grains, increaſing it gradually as long as ſeems prudent.

436 Creeping ſkirret.

88. Sium nodiflorum. SIUM, L. Creeping ſkirret.

Formerly employed as an emmenagogue and lithontriptic, but now ſeldom uſed.

437 Cummin ſeeds.

89. Cuminum Cyminum. CUMINUM, L. Cummin ſeed. See Botany, p. 146.

Officinal Preparations.

438 Cataplaſm of cummin.

a. Cataplasma Cumini, L. Cataplaſm of cummin ſeed.

This is made of cummin ſeed one pound; of bay berries, dried leaves of water germander, virginian ſnakeroot, each three ounces; cloves one ounce; rubbed together into a powder, and formed into a cataplaſm with three times their weight of honey.

439 Cummin plaſter.

b. Emplastrum Cumini, L. Cummin plaſter.

This is compoſed of cummin ſeeds, caraway ſeeds, bay berries, each three ounces; Burgundy pitch three pounds, and yellow wax three ounces. The pitch and wax are firſt melted together, and the other ingredients in fine powder mixed with them.

Both theſe preparations are intended for external application to the belly, in ſome diſorders of the ſtomach and bowels, which require ſuch a ſtimulus.

440 Aſafœtida.

90. Ferula Asafoetida, E. ASAFŒTIDA, L. D. Aſafœtida. See Botany, p. 145. and Chemistry, N° 2490.

Officinal Preparations.

441 Purified aſafœtida.

a. Asafoetida purificata. Purified aſafœtida.

Aſafœtida is purified in the ſame manner as gum ammoniac.

442 Emulſion of aſafœtida.

b. Lac Asafoetidæ, L. Emulſion of aſafœtida.

This is made in the ſame manner as the emulſion of gum ammoniac (See N° 326.), and is given in ſimilar doſes.

443 Tincture of aſafœtida.

c. Tinctura Ferulæ Asafoetidæ, E. TINCTURA ASAFŒTIDÆ, L. D. Tincture of aſafœtida.

This tincture is prepared by digeſting four ounces of aſafœtida in two pounds and a half (E), or two pounds (D), or two pints (L), of rectified ſpirit of wine, for about a week.

This is a good preparation of aſafœtida, and may be given in doſes of from 20 to 60 drops.

444 Compound aſafœtida pills.

d. Pilulæ Asafoetidæ compositæ, E. Compound aſafœtida pills.

Made by beating together aſafœtida, galbanum, and myrrh, of each eight parts, and one part of rectified oil of amber, into a maſs with ſimple ſyrup. Doſe 15 grains, or a ſcruple, three or four times a day. Chiefly in hyſteria.

445 Plaſter of aſafœtida.

e. Emplastrum Asafoetidæ, E. Plaſter of aſafœtida.

Made by melting together plaſter of ſemivitrified oxide of lead, aſafœtida, of each two parts, and galbanum and yellow wax, of each one part.

Applied to the belly in hyſteria.

446 Galbanum.

91. Bubon galbanum, E. GALBANUM, L. D. Galbanum. See Chemistry, N° 2494.

Galbanum is employed in ſimilar caſes as aſafœtida. It is ſeldom given alone.

Officinal Preparations.

447 Purified galbanum.

a. Galbanum purificatum. Strained galbanum.

Galbanum is purified by melting it, incloſed in a bladder, by the heat of boiling water, and ſtraining it through linen.

448 Tincture of galbanum.

b. Tinctura Galbani, L. Tincture of galbanum.

This is made by digeſting two ounces of galbanum, cut into ſmall pieces, in two pints of proof ſpirit, for eight days, with a gentle heat, and ſtraining. Doſe from one to two drams.

449 Compound galbanum pills.

c. Pilulæ Galbani compositæ, L. Compound galbanum pills.

Prepared of opoponax, myrrh, ſagapenum, of each an ounce, aſafœtida half an ounce.

Similar to the aſafœtida pills, and given in ſimilar doſes.

450 Angelica.

92. Angelica Archangelica, E. ANGELICA, L. D. Angelica.

An elegant aromatic, but ſeldom employed.

451 Coriander ſeeds.

93. Coriandrum sativum, E. CORIANDRUM. Coriander ſeeds. See Botany, p. 147.

452 Carraway ſeeds.

94. Carum carui, E. CARUON, L. CARUI, D. Carraway ſeeds. See Botany, p. 147.

Officinal Preparations.

453 Oil of carraway.

a. Oleum volatile Cari carui, E. OL. CARUI, L. D. Volatile oil of carraway.

Prepared by diſtillation in the ſame manner as the oil of roſemary. A very warm ſtimulant. Doſe two or three drops.

454 Spirit of carraway.

b. Spiritus Cari carui, E. SPIRITUS CARUI, L. D. Spirit of carraway.

Prepared by macerating half a pound of bruiſed carraway ſeeds in eight or nine pounds of proof ſpirit for a day or two, and then with the addition of a ſufficient quantity of water to prevent burning, diſtilling off the ſpirit.

A good dram, where drams are required, as in flatulent colic. Doſe half an ounce to an ounce.

455 Opoponax.

95. Pastinaca opoponax. OPOPONAX, L. Opoponax.

One of the gum-reſins, brought from the Eaſt Indies and the Levant. It poſſeſſes properties ſimilar to thoſe of galbanum and aſafœtida, and is uſually employed in combination with them.

96. Anethum graveolens, L. Dill-ſeed.

456 Dill ſeed. This ſeed is of a nearly oval ſhape, convex on one ſide and flat on the other, of a yellowiſh colour, of a warm pungent taſte, and aromatic ſmell. Employed ſometimes as a carminative.

Officinal Preparation.

457 Water of dill. *a.* Aqua distillata Anethi, L. Dill water.

A gallon of water diſtilled from a pound of bruiſed dill ſeeds.

458 Sweet fennel ſeed. 97. Anethum foeniculum, E. FŒNICULUM, L. D. Sweet fennel ſeeds. See Botany, p. 147.

Officinal Preparations.

459 Water of ſweet fennel. *a.* Aqua distillata foeniculi dulcis, L D. Sweet fennel water.

Prepared as *dill water.*

460 Oil of fennel. *b.* Oleum volatile Foeniculi dulcis, D. Oil of ſweet fennel ſeeds. Prepared as the *oil of roſemary,* &c.

461 Parſley. 98. Apium petroselinum, E. PETROSELINUM, L. Parſley.

The ſeeds of parſley are carminative, and the root is gently diuretic.

462 Aniſeed. 99. Pimpinella Anisum, E. ANISUM, L. D. Aniſeeds.

This plant is cultivated in Aſia, and in the ſouth of Europe. The ſeeds have a peculiar grateful ſmell, and a ſweet aromatic taſte.

They are gently ſtimulant, carminative and expectorant.

Officinal Preparations.

463 Oil of aniſeed. *a.* Oleum volatile Pimpinellæ anisi, E. OLEUM VOLATILE ANISI, L. D. Volatile oil of aniſeed.

Prepared as the other volatile oils.

This oil freezes at no very low temperature. It is a powerful and grateful ſtimulant. Doſe, a drop or two.

464 Compound ſpirit of aniſeed. *b.* Spiritus Anisi compositus, L. Compound ſpirit of aniſeed.

From aniſeed and angelica ſeed, of each half a pound, proof ſpirit a gallon, and enough water to prevent burning, a gallon of ſpirit is diſtilled.

A very agreeable cordial, in caſes of flatulence.

Order 3. Trigynia.

465 Elder. 109. Sambucus nigra, E. SAMBUCUS, L. D. Elder leaves, bark, and berries. See Botany, p. 148.

Officinal Preparations.

466 Inſpiſſated juice of elder. *a.* Succus spissatus baccæ Sambuci, L. D. Inſpiſſated juice of elder leaves.

Prepared in the ſame way as the juice of black currants. See N° 422.

467 Elder ointment. *b.* Unguentum Sambuci, L. UNG. SAMBUCINUM, D. Elder ointment.

Prepared by boiling four pounds of elder flowers in three pounds of mutton ſuet and a pint of olive-oil till they are criſp, and then ſtraining.

468 Poiſon oak. 101. Rhus Toxicodendron, E. Poiſon oak.

The leaves of this ſhrub, which is a native of North America, are very acrid, and have lately been introduced into practice by Dr Alderſon of Hull as a remedy for palſy. Doſe half a grain or a grain. In Edinburgh it has been leſs ſucceſsful than with Dr Alderſon. See Alderſon's "Eſſay on the Rhus Toxicodendron," and Duncan's Diſpenſatory.

469 Lintſeed. 102. Linum usitatissimum, E. LINUM, L. D. Common flax. Lintſeed. See Botany, p. 149.

Officinal Preparations.

470 Lintſeed oil. *a.* Oleum Lini usitatissimi, E. Lintſeed oil.

Expreſſed from the ſeeds by incloſing them in a hempen bag after beating them in a ſtone mortar. It ſhould be expreſſed without heat.

Emollient. Has been given with ſucceſs in ſome caſes of *hæmoptyſis*, *nephritis*, *colic*, and ſome internal inflammations. Doſe an ounce or two, made into an emulſion.

471 Purging flax. 103. Linum catharticum, D. Purging flax. See Botany, p. 149.

Class VI. HEXANDRIA. Order 1. Monogynia.

472 Barberry. 104. Berberis vulgaris. BERBERIS, D. Barberry.

The fruit is employed as a refrigerant. See Botany, p. 159.

473 Garlic. 105. Allium sativum, E. L. D. Garlic. See Botany, p. 156, where a long account is given of its nature and uſes.

Officinal Preparations.

474 Syrup of garlic. *a.* Syrupus Allii, D. Syrup of garlic.

Prepared by macerating a pound of ſliced garlic in two pounds of boiling water in a cloſe veſſel for 12 hours, and then adding to the ſtrained liquor four pounds of double refined ſugar.

475 Onion. 106. Allium cepa. CEPA, D. Onion.

A gentle diuretic when raw, but chiefly uſed roaſted by way of a cataplaſm.

476 Aloes. 107. Aloe perfoliata, E. ALOE SOCOTORINA, L. D. Aloes.

So full an account of the ſeveral varieties of aloes and their uſes in medicine has been given under BOTANY, p. 153, that it is neceſſary for us here only to notice its

Officinal Preparations.

477 Powder of aloes with canella.
a. PULVIS ALOES CUM CANELLA, L. HIERA PICRA. Powder of aloes with canella.

Prepared of a pound of ſocotorine aloes, and three pounds of white canella, powdered ſeparately and then mixed together.

A warm ſtimulant cathartic. Doſe 10 grains to 20. Beſt given in the form of pill.

478 Aloetic powder with guaiacum.
b. PULVIS ALOETICUS CUM GUAIACO, L. Aloetic powder with guaiacum.

Prepared by mixing together an ounce and a half of powdered ſocotorine aloes, an ounce of powdered reſin of guaiacum, and half an ounce of aromatic powder. Doſe as of the preceding.

479 Aloetic powder with iron.
c. PULVIS ALOETICUS CUM FERRO, L. Aloetic powder with iron.

Prepared of ſocotorine aloes, an ounce and half, myrrh two ounces, dry extract of gentian and vitriolated iron, each an ounce, powdered ſeparately, and mixed together.

This is conſidered as a good emmenagogue in a a doſe of 15 grains.

480 Aloetic pills.
d. PILULÆ ALOETICÆ, E. D. PILULÆ ALOES COMPOSITÆ, L. Aloetic pills. *Compound pills of aloes.*

The Edinburgh aloetic pills are prepared by beating together into a maſs equal parts of powdered aloes and ſoap. Thoſe of the London college are made of an ounce of powdered ſocotorine aloes, half an ounce of extract of gentian, two ſcruples of oil of carraway ſeeds, and enough ſyrup of ginger to form a maſs. The Dublin pills are made of an ounce of Barbadoes aloes, with half an ounce of extract of gentian, and two drams of powdered ginger, formed into a maſs with ſoap jelly.

Any of theſe compoſitions forms a good cathartic for ſedentary people. Doſe 10 to 20 grains.

481 Pills of aloes and aſafœtida.
e. PILULÆ ALOES ET ASAFOETIDÆ, E. Pills of aloes and aſafœtida.

Prepared with equal parts of powdered aloes, aſafœtida and ſoap, made into a maſs with mucilage of gum arabic.

A good remedy in dyſpepſia, eſpecially in females. Doſe about 10 grains, twice a day.

482 Pills of aloes with colocynth.
f. PILULÆ ALOES CUM COLOCYNTHIDE, E. Pills of aloes with colocynth.

Theſe are formed of ſocotorine aloes, ſcammony, each eight parts, colocynth four parts, oil of cloves and ſulphate of potaſh with ſulphur, each one part. The aloes, ſcammony, and ſalt, are together reduced to powder, and mixed with the colocynth previouſly beat to a fine powder; then the oil is added, and the maſs formed with mucilage of gum arabic.

A powerful purgative, well ſuited to melancholia and ſimilar diſeaſes. Doſe 10 to 20 grains.

483 Pills of aloes and myrrh.
g. PILULÆ ALOES ET MYRRHÆ, E. L. PILULÆ RUFI. Pills of aloes and myrrh. *Rufus's pills.*

Prepared of four parts of ſocotorine aloes, two parts of myrrh, and two parts of ſaffron (one part L.), made into a maſs with ſyrup of ſaffron.

A good laxative and ſtomachic. Doſe 15 or 20 grains.

484 Extract of aloes.
h. EXTRACTUM ALOES, C. Extract of aloes.

Prepared as *extract of gentian.*

485 Tincture of aloes.
i. TINCTURA ALOES SOCOTORINÆ, E. TINCTURA ALOES, L. D. Tincture of aloes.

Made by digeſting half an ounce of powdered ſocotorine aloes and an ounce and a half of extract of liquorice, in four ounces of alcohol and a pound of diſtilled water (E.), or in eight ounces of proof ſpirit with the ſame quantity of diſtilled water (L.), for a few days, with a gentle heat and frequent agitation. Doſe about an ounce.

486 Tincture aloes and myrrh.
k. TINCTURA ALOES ET MYRRHÆ, E. TINCTURA ALOES COMPOSITA, L. Tincture of aloes and myrrh. *Compound tincture of aloes.*

This tincture, according to the Edinburgh proceſs, is prepared by firſt digeſting two ounces of powdered myrrh in a pound and a half of alcohol mixed with half a pound of water, for four days; then adding an ounce and a half of powdered ſocotorine aloes, and an ounce of ſaffron; digeſting for three days longer, and pouring off the tincture. The London tincture is made by digeſting three ounces of ſocotorine aloes and the ſame quantity of ſaffron, in two pints of tincture of myrrh, for eight days, and ſtraining it.

Theſe tinctures differ in ſtrength: the Edinburgh tincture may be given in a doſe of half an ounce or ſix drams; the London one in half that quantity.

487 Etherial tincture o aloes.
l. TINCTURA ALOES ÆTHEREA, E. Etherial tincture of aloes.

This tincture is prepared by digeſting ſocotorine aloes, and myrrh powdered, of each an ounce and a half, with an ounce of ſliced ſaffron, in a pound of ſulphuric ether with alcohol; firſt digeſting the myrrh alone for four days, then adding the reſt, digeſting for four days longer, and ſtraining.

More ſtimulating than the other tinctures. Doſe two or three drams.

488 Wine of aloes.
m. VINUM ALOES SOCOTORINÆ, E. VINUM ALOETICUM, D. VINUM ALOES, L. Wine of ſocotorine aloes. *Aloetic wine. Sacred elixir.*

The Edinburgh wine is prepared by digeſting an ounce of powdered ſocotorine aloes, and leſſer cardamom ſeed, and ginger bruiſed, of each a dram, in two pounds of Spaniſh white wine, for ſeven days, with occaſional agitation and ſtraining. The Dublin college directs four ounces of powdered ſocotorine aloes, and two ounces of powdered canella alba, in four pounds of Spaniſh white wine for fourteen days, with frequent agitation and then filtrating. In the London proceſs, the proportions are, eight ounces of powdered aloes, two ounces of powdered canella, ſix pints of Spaniſh white wine, and two pints of proof ſpirit.

This appears from long experience to be a medicine of excellent ſervice. The doſe as a purgative is from one to two ounces. It may be introduced into the habit, ſo as to be productive of excellent effects, as an alterant, by giving it in ſmall doſes, at proper intervals: thus managed, it does not for a conſiderable time operate remarkably by ſtool; but at length proves purgative, and occaſions a lax habit of much longer continuance than that produced by other common cathartics.

489 Squill. 108. Scilla maritima, E. SCILLA, L. D. Squill. See Botany *Index*.

When the root of ſquill is taken in large doſes, it produces a violent vomiting and purging, and ſometimes ſtrangury, bloody urine, and inflammation and erosion of the ſtomach or bowels; in moderate doſes it proves emetic, without any further conſequence, and in ſmall doſes, it is a good expectorant and diuretic. It is chiefly employed as an expectorant in aſthma and peripneumony, and as a diuretic in dropſy.

Officinal Preparations.

490 Dried squill. *a.* Scilla maritima exsiccata, E. SCILLA EXSICCATA, L. SCILLÆ PREPARATÆ, D. Dried ſquill.

Squill is dried by firſt removing its outer coat, then cutting it tranſverſely into thin ſlices, and drying theſe with a gentle heat.

The ſign of its being properly dried is that it be rendered friable without loſing its bitterneſs and acrimony. This is an excellent mode of preparing ſquill, where it is to be given in ſubſtance. The doſe of dried ſquill when reduced to powder and given as an expectorant or diuretic, is from one grain to three.

491 Vinegar of squill. *b.* Acetum Scillæ maritimæ. E. ACETUM SCILLÆ, L. ACETUM SCILLITICUM, D. Vinegar of ſquill.

This is made by macerating dried ſquill in vinegar or diſtilled vinegar, with a proportion of proof ſpirit. The proportions of the different colleges vary. The Edinburgh college directs two ounces of ſquill to two pounds and a half of diſtilled acetous acid, and three ounces of alcohol; that of London a pound of ſquill, ſix pints of vinegar, and half a pint of proof ſpirit; while the Dublin proportions are half a pound of ſquill, three pounds of vinegar, and four ounces of proof ſpirit. The ſquill is firſt macerated with the vinegar for ſome days with a gentle heat, then the liquor is expreſſed, and the ſpirit added to it. Doſe from two drams to half an ounce, chiefly in compoſition.

492 Syrup of squill. *c.* Syrupus Scillæ maritimæ, E. Syrup of ſquill.

This ſyrup is made with two pounds of vinegar of ſquill and three pounds and a half of double refined ſugar, diſſolved with a gentle heat.

A good expectorant. Doſe from half an ounce to an ounce.

493 Oxymel of squill. *d.* Oxymel Scillæ, L. Oxymel of ſquill.

Prepared by boiling three pounds of clarified honey, with two pints of vinegar of ſquill, in a glaſs veſſel, with a gentle heat, to the conſiſtence of a ſyrup.

This is not ſo good a preparation as the ſyrup of ſquill, and is very apt to produce ſickneſs. Doſe three or four drams.

494 Conserve of squill. *e.* Conserva Scillæ, L. Conſerve of ſquill.

This is made by beating together in a mortar, an ounce of freſh ſquill and five ounces of double refined ſugar.

A very injudicious and nauſeous preparation.

495 Tincture of squill. *f.* Tinctura Scillæ, L. D. Tincture of ſquill.

This tincture is prepared by digeſting four ounces of freſh dried ſquill, in two pints, or two pounds of proof ſpirit, for ſeven or eight days, and pouring off the clear liquor.

This is a good preparation of ſquill, eſpecially when it is intended as a diuretic; doſe twenty or thirty drops.

496 Honey of squill. *g.* Mel Scillæ, L. MÉL SCILLITICUM, D. Honey of ſquill.

Prepared by boiling together in a glaſs veſſel, three pounds of clarified honey and two pints of the tincture of ſquill, to the conſiſtence of a ſyrup. Doſe, a dram or two.

497 Squill pills. *h.* Pilulæ Scillæ, L. PILULÆ SCILLITICÆ, E. D. Squill pills.

Theſe, according to the London and Dublin colleges, are to be prepared by beating together a dram of freſh dried ſquill reduced to powder, three drams of powdered ginger, three drams of ſoap, and two drams of gum ammoniac, with a ſufficient quantity of ſyrup of ginger, or jelly of ſoap, to form a maſs fit for making pills. In the Edinburgh proceſs a ſcruple of dried ſquill, in fine powder, a dram of gum ammoniac, a dram of powdered leſſer cardamom ſeeds, and a dram of extracted liquorice, are beaten into a maſs, with ſimple ſyrup.

This is a good form of ſquill, when intended as an expectorant. Doſe from 10 to 15 grains.

498 White lily. 109. Lilium candidum. LILIUM ALBUM, D. White lily root. See Botany, p. 156.

499 Calamus aromaticus. 110. Acorus Calamus, E. CALAMUS AROMATICUS, L. Sweet flag. See Botany, p. 159.

Order III. Trigynia.

500 Colchicum. 111. Colchicum Autumnale, E. COLCHICUM, L. D. Colchicum, or *meadow ſaffron.* See Botany, p. 161.

Officinal Preparations.

501 Syrup of colchicum. *a.* Syrupus Colchici autumnalis, E. Syrup of colchicum.

Prepared by firſt macerating an ounce of freſh colchicum root, cut into thin ſlices, in 16 ounces of vine-

gar,

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gar, for two days, with occasional agitation, and then boiling the expressed liquor with 26 ounces of double refined sugar into a syrup.

Employed as a diuretic, in a dose of from a dram to an ounce or more.

502 Oxymel of colchicum.

b. Oxymel Colchici, L. Oxymel of colchicum.

This is made in the same manner as the syrup, only that two pounds of clarified honey are used instead of sugar to the pint of vinegar of colchicum. It is given in similar doses with the former.

503 Sorrel.

112. Rumex acetosa, E. ACETOSA PRATENSIS, L. ACETOSA, D. Sorrel. See Botany, p. 160.

Class VII. HEPTANDRIA. Order 1. Monogynia.

504 Horse-chesnut.

113. Æsculus hippocastanum, E. HIPPOCASTANUM. Horse-chesnut bark and fruit.

The bark of horse chesnut is a powerful astringent, and has lately been recommended as a substitute for cinchona. It is certainly a good tonic, and may be given in powder from half a dram to a dram; or a dram of the extract of it may be mixed with an ounce of cinnamon water, and given in the dose of a tea spoonful three or four times a-day. A strong infusion of it, snuffed up the nose, has long been employed as an errhine.

Class VIII. OCTANDRIA. Order 1. Monogynia.

Elemi.

114. Amyris elemifera. ELEMI, L. Resin of elemi. See Botany, p. 166.; and Chemistry, N° 2471.

Officinal Preparations.

506 Elemi ointment.

a. Unguentum Elemi, D. UNG. ELEMI COMPOSITUM, L. Elemi ointment.

Prepared by first melting a pound of elemi with two pounds of mutton suet, and on removing them from the fire, immediately adding 10 ounces of turpentine, and two ounces of olive oil, and straining the mixture.

A stimulating ointment, in much reputation with some surgeons for cleansing ulcers.

507 Balm of Gilead.

115. Amyris Gileadensis, E. BALSAMUM GILEADENSE. Balsam or balm of Gilead. See Botany, p. 166.

508 Mezereon.

116. Daphne Mezereum, E. MEZEREUM, L. MEZEREON, D. Mezereon or *spurge laurel*. See Botany, p. 168.

Officinal Preparations.

509 Decoction of mezereon.

a. Decoctum daphnes Mezerei, E. Decoction of mezereon.

Prepared by boiling with a gentle heat two drams of the bark of mezereon root, and half an ounce of bruised liquorice root, in three pounds of water to two pounds.

Much recommended as a diaphoretic and stimulant, in rheumatic affections and in cutaneous eruptions. Dose from four to eight ounces twice a day.

510 Great bistort.

117. Polygonum Bistorta, E. BISTORTA, L. D. Great bistort or *snakeweed*. See Botany, p. 168.

Class IX. ENNEANDRIA. Order 1. Monogynia.

511 Cinnamon.

118. Laurus Cinnamomum, E. CINNAMOMUM, L. D. Cinnamon. *The bark and its essential oil.* See Botany, p. 170. and 174. See also the article Ceylon.

Officinal Preparations.

512 Cinnamon water.

a. Aqua Lauri Cinnamomi, E. AQUA CINNAMOMI, L. D. Cinnamon water. *Barley cinnamon.*

A gallon of water distilled from a pound of bruised cinnamon.

An excellent cordial in a dose of two ounces.

513 Spirit of cinnamon.

b. Spiritus Lauri Cinnamomi, E. SPIRITUS CINNAMOMI, L. D. Spirit of cinnamon.

A gallon of proof spirit distilled from a pound of bruised cinnamon.

Preferable to the former only where ardent spirits are required.

514 Tincture of cinnamon.

c. Tinctura Lauri Cinnamomi, E. TINCTURA CINNAMOMI, L. D. Tincture of cinnamon.

Made by digesting three ounces, or three ounces and a half of bruised cinnamon, in about two pounds of proof spirit, for about a week.

A better tonic than the spirit, as it contains the astringent as well as aromatic principle of cinnamon. Dose two or three drams.

515 Compound tincture of cinnamon.

d. Tinctura Cinnamomi composita, E. L. TINCTURA AROMATICA, D. Compound tincture of cinnamon. *Aromatic tincture.*

Made by digesting an ounce (or six drams, L. D.) of bruised cinnamon, an ounce (or two drams, D. or three drams, L.) of bruised cardamom seeds, two drams of powdered long pepper, (and two drams of powdered ginger, L. D.) in two pounds and a half (or two pounds, D. or two pints, L.) of proof spirit, for seven days.

A very hot tincture, useful in asthenic atony of the stomach. Dose two or three drams.

516 Aromatic powder.

e. Pulvis aromaticus, E. L. D. Aromatic powder.

The Edinburgh aromatic powder is prepared of equal parts of cinnamon, lesser cardamom seeds, and ginger, beaten together to a very fine powder. The proportions of the other colleges are cinnamon two ounces, lesser cardamom seeds, ginger and long pepper, of each an ounce. Dose 10 grains to a scruple.

517 Aromatic electuary.

f. Electuarium aromaticum, E. D. CONFECTIO AROMATICA, L. Aromatic electuary or *confection*. *Cordial confection.*

The Edinburgh electuary is made by mixing one part of aromatic powder with two parts of ſyrup of orange peel. That of the Dublin college is prepared by mixing three ounces of conſerve of orange peel with half an ounce of powdered cinnamon, half an ounce of powdered nutmeg, two drams of powdered ginger, and two drams of ſaffron, with an ounce of double refined ſugar, and beating them together with a ſufficient quantity of ſyrup of orange peel into an electuary. The London confection is made by firſt macerating half a pound of zedoary in coarſe powder, and half a pound of ſaffron, in three pints of water for 24 hours, preſſing out the liquor, and evaporating it to a pint and a half, and adding 16 ounces of compound powder of crabs claws, of cinnamon and nutmeg each two ounces, cloves an ounce, leſſer cardamom ſeeds half an ounce, all in fine powder, and two pounds of double refined ſugar, ſo as to form an electuary.

Of theſe compoſitions, the firſt is the beſt. Doſe a ſcruple to half a dram.

Caſſia bark. 119. LAURUS CASSIA, E. CASSIA LIGNEA, D. Caſſia bark. See BOTANY, p. 173.

This is commonly employed inſtead of cinnamon, and though not ſo delicate, is as efficacious as that expenſive drug. The buds of caſſia are, we believe, ſtronger than the bark.

Officinal Preparation.

Caſſia water. *a.* AQUA LAURI CASSIÆ, E. Caſſia water.

Diſtilled like cinnamon water, for which it is commonly ſubſtituted.

520 Camphor. 120. LAURUS CAMPHORA, E. The camphor tree. CAMPHORA, L. D. Camphor or *Camphire.* See BOTANY, page 170 and 174; and CHEMISTRY, N° 2141. See alſo the article CAMPHORA.

Internally camphor is adminiſtered as a diaphoretic in typhoid fevers, in rheumatiſm, in low eruptive fevers, in a doſe of from five to 20 grains; and as an antiſpaſmodic in hiccup, hyſteria, epilepſy, and in mania and melancholia, eſpecially in that maniacal affection that ſometimes takes place in lying-in women. It is applied externally in caſes of gangrene, to diſcuſs indolent tumors, and to diſperſe collections of milk in the breaſt of women who are weaning their infants.

Officinal Preparations.

521 Camphorated emulſion. *a.* EMULSIO CAMPHORATA, E. Camphorated emulſion.

Prepared by firſt beating together two drams of blanched ſweet almonds, and a dram of double refined ſugar, then rubbing with theſe a ſcruple of camphor, and gradually adding ſix ounces of water to make an emulſion. Doſe two or three ounces.

522 Camphorated mixture. *b.* MISTURA CAMPHORATA, L. Camphorated mixture.

Made by rubbing a dram of camphor, firſt with a little rectified ſpirit of wine, and then with half an ounce of double refined ſugar, and adding gradually a pint of boiling diſtilled water, and ſtraining off the clear liquor.

Scarcely ſo active as the foregoing. Doſe much the ſame.

c. TINCTURA CAMPHORÆ, E. SPIRITUS CAMPHORATUS, L. D. Tincture of camphor. *Camphorated ſpirit.*

A ſolution of camphor in rectified ſpirit. The ſeveral colleges direct very different proportions, viz. the Edinburgh an ounce, or two or three ounces, of camphor, to a pound of alcohól; the London four ounces to two pints; and the Dublin college half an ounce to eight ounces. [illegible] of camphor.

d. OLEUM CAMPHORATUM, E. Camphorated oil.

A ſolution of camphor in oil olive, in the proportion of half an ounce of the former to two ounces of the latter, made by triturating them together in a glaſs or marble mortar.

e. LINIMENTUM CAMPHORÆ COMPOSITUM, L. LINIMENTUM CAMPHORÆ, D. Compound liniment of camphor. [illegible] ed liniment.

Made by firſt mixing ſix ounces of water of pure ammonia (L.) or 10 ounces of water of carbonated ammonia (D.) with 16 ounces, (or two pounds, D.) of ſpirit of lavender, and diſtilling off the ſpirit from a glaſs retort; then diſſolving in the diſtilled ſpirit two ounces (L.) or three ounces (D.) of camphor.

Theſe three laſt are intended for external application in the caſes above mentioned, and the laſt is the moſt ſtimulating.

121. LAURUS NOBILIS, E. LAURUS, L. Bay-tree. See BOTANY, p. 171, and 172.

The leaves, berries, and expreſſed oil of the berries, are employed in medicine.

527 Saſſafras. 122. LAURUS SASSAFRAS, E. SASSAFRAS, L. D. Saſſafras wood, root, and bark. See BOTANY, p. 173.

Employed chiefly as a gentle diaphoretic or alterative in cutaneous eruptions, by way of decoction or infuſion.

Officinal Preparation.

a. OLEUM VOLATILE LAURI SASSAFRAS, E. OLEUM SASSAFRAS, L. Oil of ſaſſafras.

Diſtilled as the other volatile oils.

Order 2. TRIGYNIA.

123. RHEUM PALMATUM, E. RHABARBARUM, L. D. Rhubarb. See BOTANY, p. 175.

Officinal Preparations.

530 Infuſion of rhubarb. *a.* INFUSUM RHEI PALMATI, E. Infuſion of rhubarb.

Made by macerating half an ounce of bruiſed rhubarb in eight ounces of boiling water for 12 hours; then adding an ounce of ſpirit of cinnamon, and ſtraining. Doſe half an ounce to an ounce and a half.

b. VINUM RHEI PALMATI, E. VINUM RHABARBARI, L. Rhubarb wine.

The Edinburgh wine is prepared by infuſing two ounces of ſliced rhubarb and a dram of canella alba in 15 ounces of Spaniſh white wine, and two ounces of diluted alcohol, for ſeven days, and ſtraining through paper. The London formula directs two ounces and a half of ſliced rhubarb, half an ounce of bruiſed leſſer cardamom ſeeds, and two drams of ſaffron, to be digeſted in two pints of Spaniſh white wine, and half a pint of proof ſpirit, for 10 days.

The Edinburgh wine is the ſtronger, and may be given in the doſe of an ounce. Doſe of the London, about an ounce and a half, or a ſmall wine glaſs full.

532 Tincture of rhubarb.

c. TINCTURA RHEI PALMATI, E. TINCTURA RHABARBARI, L. D. Tincture of rhubarb.

Prepared by digeſting three ounces (E.) or two ounces (L. D.) of ſliced rhubarb, half an ounce (E.) or two drams (L. D.) of bruiſed cardamom ſeeds, (and two drams of ſaffron L. D.) in two pounds and a half (E.) or two pounds (D.) or two pints (L.) of proof ſpirit, for about a week, and ſtraining.

As a purgative, this may be given in the doſe of an ounce; as a ſtomachic from two to four drams.

533 Compound tincture of rhubarb.

d. TINCTURA RHABARBARI COMPOSITA, L. Compound tincture of rhubarb.

Prepared of two ounces of ſliced rhubarb, half an ounce of bruiſed liquorice root, two drams of powdered ginger, and two drams of ſaffron, digeſted for 14 days in 12 ounces of proof ſpirit mixed with a pint of diſtilled water.

Uſes and doſes as of the preceding.

534 Tincture of rhubarb and aloes.

e. TINCTURA RHEI ET ALOES, E. Tincture of rhubarb and aloes.

Made by digeſting 10 drams of ſliced rhubarb, ſix drams of powdered ſocotorine aloes, and half an ounce of bruiſed cardamom ſeeds, in two pounds and a half of diluted alcohol, for ſeven days.

Doſe half an ounce to an ounce.

535 Tincture of rhubarb and gentian.

f. TINCTURA RHEI ET GENTIANÆ, E. Tincture of rhubarb and gentian.

Made by digeſting two ounces of ſliced rhubarb, and half an ounce of ſliced gentian root, in two pounds and a half of diluted alcohol, for ſeven days, and ſtraining.

A good ſtomachic. Doſe two or three drams.

CLASS X. DECANDRIA. Order 1. MONOGYNIA.

536 Balſam of Peru.

123. MYROXYLON PERUIFERUM, E. BALSAMUM PERUVIANUM, L. D. Balſam of Peru. See BOTANY, p. 182, and CHEMISTRY, N° 2484.

Officinal Preparation.

537 Tincture of balſam of Peru.

a. TINCTURA BALSAMI PERUVIANI, L. Tincture of balſam of Peru.

Made by digeſting four ounces of balſam of Peru in a pint of rectified ſpirit of wine till the balſam is diſſolved.

Doſe half a dram to a dram and a half as a ſtimulant.

538 Balſam of Tolu.

125. TOLUIFERA BALSAMUM, E. BALSAMUM TOLUTANUM, L. D. Balſam of Tolu. See BOTANY, p. 182, and CHEMISTRY, N° 2483.

Officinal Preparations.

539 Tincture of balſam of Tolu.

a. TINCTURA TOLUIFERÆ BALSAMI, E. TINCTURA BALSAMI TOLUTANI, L. D. Tincture of balſam of Tolu.

Made by digeſting an ounce, or an ounce and half (D.), of balſam of Tolu in a pound, or a pint (L.), of alcohol, till the balſam is diſſolved.

This is the beſt form of employing this balſam, and it may be given mixed with honey, or, as in the following preparation, with ſyrup. Doſe, half a dram to two drams as an expectorant or ſtimulant.

540 Syrup of Tolu.

b. SYRUPUS TOLUIFERÆ BALSAMI, L. SYRUPUS TOLUTANUS, L. Syrup of balſam of Tolu, or *balſamic ſyrup*.

The Edinburgh college direct this ſyrup to be prepared by mixing an ounce of the above tincture with two pounds of common ſyrup. The London proceſs is to boil eight ounces of balſam of Tolu with three pints of diſtilled water for two hours, ſtrain the liquor, and boil it with a ſufficient quantity of double refined ſugar to make a ſyrup. The Edinburgh formula produces both a cheaper and a ſtronger ſyrup.

541 Caſſia fiſtula.

126. CASSIA FISTULA, E. CASSIA FISTULARIS, L. D. Caſſia fruit. See BOTANY, p. 181.

Officinal Preparations.

542 Electuary of caſſia.

a. ELECTUARIUM CASSIÆ FISTULÆ, E. ELECTUARIUM CASSIÆ, L. D. Electuary of caſſia.

This is prepared of four parts (E.), or half a pound (L.), of the pulp of caſſia; one part (E.), or an ounce (L.), of the pulp of tamarinds; one part (E.), or two ounces (L.), of manna; and four parts or half a pound of ſyrup of damaſk roſes. The manna is firſt diſſolved in the ſyrup by a gentle heat, the pulps are then added, and the whole evaporated to the conſiſtence of an electuary.

A gentle laxative. Doſe two or three drams.

543 Senna.

127. CASSIA SENNA, E. SENNA, L. D. Senna leaves. See Woodville, Lewis, and Duncan (c.)

Officinal

(c) This volume is now drawing very near a cloſe, and it is indiſpenſible that the preſent article ſhould not extend beyond it. It is therefore neceſſary that in the remaining part of the materia medica, we ſhould be extremely conciſe, and ſhould omit all the natural hiſtory, and much of the medical hiſtory, of the ſimple articles. Fortunately, in many caſes, theſe circumſtances have been anticipated under botany: and where this has not been

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Officinal Preparations.

544 Simple infuſion of ſenna.

a. INFUSUM SENNÆ SIMPLEX, L. Simple infuſion of ſenna.

Prepared by macerating an ounce and a half of ſenna, and a dram of powdered ginger, in a pint of boiling water, for an hour, in a covered veſſel. Doſe about two or three ounces.

545 Tartarized infuſion of ſenna.

b. INFUSUM SENNÆ TARTARISATUM, L. Tartarized infuſion of ſenna.

Inſtead of ginger, half an ounce of bruiſed coriander ſeeds and two drams of cryſtals of tartar are here added. Doſe as of the above.

546 Infuſion of tamarinds with ſenna.

c. INFUSUM TAMARINDI CUM SENNA, E. Infuſion of tamarinds with ſenna.

Prepared by macerating an ounce of preſerved tamarinds, a dram (or two, three, &c. drams) of ſenna, half a dram of bruiſed coriander ſeeds, and half an ounce of brown ſugar, in eight ounces of boiling water, for four hours, in a glaſs veſſel.

An excellent laxative. Doſe from two to four ounces, according to the quantity of *ſenna*.

547 Compound tincture of ſenna.

d. TINCTURA SENNÆ COMPOSITA, E. TINCTURA SENNÆ, L. D. Compound tincture of ſenna.

The Edinburgh tincture is made by digeſting two ounces of ſenna, an ounce of bruiſed jalap root, and half an ounce of bruiſed coriander ſeeds, in three pounds and a half of diluted alcohol, for ſeven days, ſtraining the tincture, and adding four ounces of double-refined ſugar. The London and Dublin tinctures are made by digeſting a pound of ſenna, an ounce and a half of bruiſed carraway ſeeds, half an ounce of bruiſed cardamom ſeeds, and 16 ounces of ſtoned raiſins, in a gallon or nine pounds (D.) of proof ſpirit, for 14 days. Doſe half an ounce to an ounce and a half.

548 Electuary of ſenna.

e. ELECTUARIUM CASSIÆ SENNÆ, E. ELECTUARIUM SENNÆ, L. D. Electuary of ſenna. *Lenitive electuary.*

The Edinburgh and London electuaries are compoſed of eight ounces of pounded ſenna, four ounces of powdered coriander ſeeds, three ounces of liquorice root, half a pound or a pound of figs, half a pound of pulp of tamarinds, half a pound of pulp of prunes (and half a pound of pulp of caſſia (L.), and two pounds and a half of double refined ſugar. That of Dublin is made of four ounces of powdered ſenna, a pound of pulp of French prunes, two ounces of pulp of tamarinds, a pound and a half of molaſſes, and two drams of eſſential oil of carraway. Doſe about half an ounce.

549 Extract of ſenna.

f. EXTRACTUM CASSIÆ SENNÆ, E. EXTRACTUM SENNÆ, L. D. Extract of ſenna.

Made like other extracts that have been mentioned. Doſe 10 to 30 grains. Not much uſed.

550 Compound powder of ſenna.

g. PULVIS SENNÆ COMPOSITUS, L. Compound powder of ſenna.

Compoſed of ſenna, cryſtals of tartar, each two ounces, ſcammony half an ounce, and ginger two drams. Doſe two or three ſcruples.

551 Logwood.

128. HÆMATOXYLON CAMPECHIANUM, E. HÆMATOXYLON, L. D. LIGNUM CAMPECHENSE. Logwood. See BOTANY, p. 183.

Officinal Preparation.

552 Extract of logwood.

a. EXTRACTUM HÆMATOXYLI, L. Extract of logwood.

Made by boiling logwood in ſucceſſive portions of water, and evaporating the mixed liquors to a proper conſiſtence. Doſe a ſcruple to two ſcruples.

553 Mahogany bark.

129. SWIETENIA MAHAGONI, E. Mahogany tree bark.

554 Febrifuge ſwietenia.

130. SWIETENIA FEBRIFUGA, E. Febrifuge Swietenia bark.

Theſe barks are good tonics, and may be uſed inſtead of the cinchona.

555 Guaiacum.

131. GUAIACUM OFFICINALE, E. GUAIACUM, L. D. Guaiacum wood, bark and reſin. See BOTANY, p. 181.; and for an excellent account of the nature and chemical properties of the reſin, ſee Phil. Tranſ. for 1806. p. 89.

Officinal Preparations.

556 Compound decoction of guaiacum.

a. DECOCTUM GUAIACI COMPOSITUM, E. Compound decoction of guaiacum. *Decoction of the woods.*

Made by boiling three ounces of guaiacum raſpings, and two ounces of ſtoned raiſins, in ten pounds of water to five pounds; adding towards the end, of ſliced ſaſſafras and bruiſed liquorice root, each an ounce.

Given as a diet drink in cutaneous eruptions and rheumatiſm, to the extent of a pint in the day.

557 Tincture of guaiacum.

b. TINCTURA GUAIACI OFFICINALIS, E. Tincture of guaiacum.

Made by digeſting a pound of powdered reſin of guaiacum in two pounds and a half of alcohol for ten days, and filtering.

A good diaphoretic. Doſe, two or three drams mixed with honey or ſyrup.

558 Ammoniated tincture of guaiacum.

c. TINCTURA GUAIACI AMMONIATA, E. TINCTURA GUAIACI VOLATILIS, D. TINCTURA GUAIACI, L. Ammoniated tincture of guaiacum.

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the caſe, we here make a general reference to Woodville's "Medical Botany," Lewis's "Experimental Hiſtory," Duncan's "New Diſpenſatory," the "Practical Synopſis," and "*Theſaurus Medicaminum*."

This is made by digeſting four ounces of powdered reſin of guaiacum in about one pound and a half of ammoniated alcohol for ſeven days (three days L.), and filtering.

More ſtimulant than the laſt. Doſe one or two drams.

559 Rue.

132. Ruta graveolens, E. RUTA, L. D. Rue. See Botany, p. 182.

Officinal Preparations.

560 Volatile oil of rue.

a. Oleum volatile Rutæ, D. Volatile oil of rue.

Diſtilled as other volatile oils. Uſed chiefly as an anthelmintic. Doſe from three to ſix drops.

561 Extract of rue.

b. Extractum Rutæ graveolentis, E. EXTRACTUM RUTÆ. L. D. Extract of rue.

Made like other watery extracts. Doſe about one ſcruple.

562 Simarouba.

133. Quassia Simarouba, E. SIMAROUBA, L. D. Simarouba, or mountain damſon bark.

Uſed as a tonic in dyſentery, obſtinate diarrhœa, indigeſtion, and intermittent fevers. Doſe about a dram in ſubſtance, or two drams in the form of decoction, which is the better mode of exhibition.

563 Quaſſia.

134. Quassia excelsa, E. QUASSIA, L. Quaſſia wood, bark, and root.

A ſtrong bitter, and good tonic, generally given by way of infuſion, in the proportion of one to two drams to a pint of water.

564 Yellow-flowered rhododendron.

135. Rhododendron Chrysanthum, E. Yellow-flowered rhododendron. See Botany, p. 184. and Duncan's Diſpenſatory.

565 Whortleberry.

136. Arbutus Uva Ursi, E. UVA URSI, L. D. Whortleberry. See Botany, p. 184.

566 Storax.

137. Styrax officinale, E. STYRAX, L. STYRAX CALAMITA, D. Storax. See Botany, p. 184, and Chemistry, N° 2481.

Officinal Preparation.

567 Purified ſtorax.

a. Styrax purificata, L. D. Purified ſtorax.

Storax is purified by diſſolving it in rectified ſpirit, ſtraining the ſolution, and reducing it to a proper thickneſs by a gentle heat.

Employed chiefly as an ingredient in a tincture to be mentioned immediately.

568 Benzoin.

138. Styrax Benzoin, E. BENZOE, L. BENZOINUM, D. Benzoin or benjamin. See Botany, p. 184, and Chemistry, N° 2480.

Officinal Preparations.

569 Compound tincture of benzoin.

a. Tinctura Benzoes composita, E. L. BALSAMUM TRAUMATICUM. Compound tincture of benzoin. *Traumatic [illegible], or friars balſam.*

Prepared by digeſting three ounces of powdered benzoin (two ounces of ſtrained ſtorax, L.) an ounce of balſam of Tolu, and half an ounce of powdered ſocotorine aloes, in two pounds of alcohol, for ſeven days (or, three days, L.) and ſtraining.

This tincture forms a good expectorant, made into an emulſion with honey: and it has been long, though perhaps undeſervedly, celebrated, as an external application to wounds.

570 Benzoic acid.

b. Acidum Benzoicum, E. SAL BENZOINI, D. FLORES BENZOES, L. Benzoic acid. *Salt of benzoin. Flowers of benjamin.*

The Edinburgh proceſs for obtaining this acid is, to triturate 24 ounces of benzoin with eight ounces of carbonate of ſoda; to boil this mixture in 16 pounds of water, conſtantly ſtirring, ſtraining the decoction; repeat the boiling with ſix pounds of more water, ſtraining, mixing the two decoctions, and evaporating till only two pounds remain, filtering again, and dropping into the fluid diluted ſulphuric acid as long as there is any precipitation; then diſſolving the precipitated acid in boiling water, ſtraining the ſolution through linen, and ſetting it aſide to cryſtallize; and laſtly waſhing the cryſtals with cold water, and drying them.

For other methods of procuring this acid, and for an account of its chemical properties, ſee Chemistry, N° 714 *et ſeq.*

Benzoic acid is employed as an expectorant, in a doſe of a grain or two.

571 Balſam of copaiva.

139. Copaifera officinalis, E. BALSAMUM COPAIVA, L. BALSAMUM COPAIBA, D. Balſam of Copaiva. See Botany, p. 185.

Order II. Digynia.

572 Clove julyflower.

140. Dianthus Caryophyllus, E. CARYOPHYLLUM RUBRUM, L. D. Clove julyflower. See Botany, p. 196.

Officinal Preparations.

573 Syrup of clove julyflower.

a. Syrupus Dianthi Caryophylli, E. SYRUPUS CARYOPHYLLI RUBRI, L. Syrup of clove julyflower.

Made by macerating a pound or two of the petals of clove julyflowers freſh gathered, and freed from the heels, in four pounds or ſix pints of boiling water for 12 hours, in a glaſs veſſel, ſtraining the infuſion, and adding of double refined ſugar, ſeven pounds, or as much as is ſufficient to form a ſyrup.

Order 4. Pentagynia.

574 Wood ſorrel.

141. Oxalis Acetocella. LUJULA, L. ACETOSELLA, D. Wood ſorrel. See Botany, p. 187.

Officinal Preparations.

575 Conſerve of wood ſorrel.

a. Conserva Acetosellæ, D. Conſerve of wood ſorrel.

Made by beating the leaves of wood ſorrel in a marble mortar with a wooden peſtle, firſt by themſelves, and then with three times their weight of double refined ſugar, till they are thoroughly combined.

Class XI. DODECANDRIA. Order I. Monogynia.

142. Asarum Europæum, E. ASARUM, L. D. Asarabacca. See Botany, p. 190.

Officinal Preparations.

577 *a.* Pulvis Asari compositus, E. L. D. Compound powder of aſarabacca.

Prepared according to the London and Dublin proceſs, of equal parts of aſarabacca, ſweet marjoram, Syrian herb maſtich, and lavender, dried and reduced together to a fine powder. In the Edinburgh formula there are uſed three parts of aſarabacca, one of marjoram, and one of lavender.

Uſed as an errhine.

578 143. Canella alba, E. L. D. See Botany, p. 190.

Class XII. ICOSANDRIA. Order 1. Monogynia.

579 144. Eugenia Caryophyllata. CARYOPHYLLUS AROMATICUS, E. CARYOPHYLLA AROMATICA, D. Clove tree, and its eſſential oil. See Woodville's Botany, and Duncan's Diſpenſatory.

580 145. Myrtus Pimenta, E. PIMENTO, L. D. Pimento, *Jamaica pepper*, or *allſpice*. See Botany, p. 194.

Officinal Preparations.

581 *a.* Aqua Myrtæ Pimentæ, E. AQUA PIMENTO, L. Pimento water.

A gallon of water diſtilled from half a pound of pimento. Doſe, a ſmall wine glaſs full.

582 *b.* Oleum volatile Myrti Pimentæ, E. Volatile oil of pimento.

Diſtilled as other volatile oils. Given as a ſtimulus in a doſe of two or three drops.

583 *c.* Spiritus Myrti Pimentæ, E. SPIRITUS PIMENTO, L. D. Spirit of pimento.

A gallon of proof ſpirit diſtilled from half a pound of bruiſed pimento. Doſe about an ounce.

584 146. Punica granatum, E. GRANATUM, L. D. Pomegranate. See Botany, p. 195.

585 147. Eucalyptus resinifera. KINO, E. L. D. Kino. See Duncan's Diſpenſatory.

Officinal Preparation.

a. Tinctura Kino, E. D. Tincture of kino.

Prepared by digeſting two ounces of powdered kino in a pound and a half of diluted alcohol, for ſeven days, and filtering. Doſe from one dram to three, as an aſtringent.

148. Amygdalus communis, E. AMYGDALÆ DULCES, L. D. AMYGDALÆ AMARÆ, L. Sweet and bitter almonds. See Botany, p. 19[illegible].

Officinal Preparations.

a. Oleum Amygdali communis, E. OLEUM AMYGDALARUM, L. D. Oil of almonds.

Expreſſed in the uſual manner. Given as an emollient, *ad libitum*.

b. Emulsio Amygdali communis, E. LAC AMYGDALÆ vel AMYGDALARUM, L. D. Almond emulſion.

Made by beating an ounce of blanched ſweet almonds, or an ounce and a half, either by themſelves, or with half an ounce of double refined ſugar, and gradually pouring on them two pounds and a half or two pints of diſtilled water, to form an emulſion.

A grateful demulcent, that may be drunk in any quantity.

149. Prunus domestica, E. L. D. Prunes. Prunes.

Uſed as a gentle laxative, chiefly in compoſition.

150. Prunus spinosa. PRUNUS SYLVESTRIS, L. Sloes.

Employed as an aſtringent.

Officinal Preparation.

a. Conserva Pruni sylvestris, L. Conſerve of ſloes. Conſerve of ſloes.

Made by mixing any quantity of the pulp of ſloes, obtained by boiling them in water till they are ſoft, and ſubſequent expreſſion, with three times its weight of double refined ſugar.

Order 4. Pentagynia.

151. Pyrus cydonia. CYDONIA MALUS, L. Quince ſeeds. See Botany, p. 197. Quince ſeeds.

Officinal Preparation.

a. Mucilago Seminum Cydonii mali, L. Mucilage of quince ſeed.

Made by boiling one dram of quince ſeeds in eight ounces of diſtilled water, with a ſlow fire for 10 minutes, and then ſqueezing the mucilage through linen.

Order 5. Polygynia.

152. Rosa Gallica, E. ROSA RUBRA, L. D. Red roſe buds. See Botany, p. 198. 595 Red roſe.

Officinal Preparations.

a. Infusum Rosæ gallicæ, E. INFUSUM ROSÆ, L. INFUSUM ROSARUM, D. Infuſion of red roſes.

Prepared by infuſing one ounce of the dried petals of red roſes, in about two pounds and a half of boiling water, in a glaſs or unglazed earthen veſſel, till cold, then adding about half a dram of ſulphuric acid, and about two ounces of double refined ſugar.

A pleaſant refrigerant and gentle aſtringent, given internally in hemorrhages, and much employed as a gargle.

597 Syrup of red roſes. *b.* Syrupus Rosæ gallicæ, E. Syrup of red roſes.

Made by macerating ſeven ounces of the dried petals of red roſes in five pounds of boiling water for 12 hours, ſtraining the liquor, and adding ſix pounds of double refined ſugar to make a ſyrup.

c. Mel Rosæ, L. D. Honey of roſes.

598 Honey of roſes. Made by macerating four ounces of dried petals of red roſe buds in three pints of boiling diſtilled water, for ſix hours, then ſtraining the liquor, and boiling it with five pounds of clarified honey to the conſiſtence of a ſyrup.

599 Conſerve of roſes. *d.* Conserva Rosæ rubræ, L. CONSERVA ROSÆ, D. Conſerve of roſes.

Made by beating the freſh petals of red roſes with three times their weight of double-refined ſugar till they are thoroughly mixed.

600 Damaſk roſe. 153. Rosa Damascena, L. D. ROSA CENTIFOLIA, E. The damaſk roſe. See Botany, p. 198.

Officinal Preparations.

601 Roſe water. *a.* Aqua Rosæ centifoliæ, E. AQUA ROSÆ, L. D. Roſe water.

A gallon of water diſtilled from ſix pounds of the freſh petals of damaſk roſes.

Chiefly employed as a perfume.

602 Syrup of damaſk roſes. *b.* Syrupus Rosæ centifoliæ, E. SYRUPUS ROSÆ, L. Syrup of damaſk roſes.

Made by macerating one pound (E.) or ſeven ounces (L.) of the freſh petals of damaſk roſes, in four pounds or four pints of boiling diſtilled water, and adding to the ſtrained liquor three pounds (E.) or ſix pounds (L.) of double-refined ſugar, to make a ſyrup.

603 Hips. 154. Rosa canina, E. CYNOSBATUS, L. Hips. See Botany, p. 198.

Officinal Preparation.

604 Conſerve of hips. *a.* Conserva Rosæ caninæ, E. CONSERVA CYNOSBATI, L. Conſerve of hips.

Made by beating any quantity of the pulp of ripe hips with three times its weight of double-refined ſugar.

605 Raſpberry. 155. Rubus idæus, L. D. Raſpberry. See Botany, p. 198.

Officinal Preparation.

606 Syrup of raſpberry juice. *a.* Syrupus fructus Rubi idæi, L. Syrup of raſpberry juice.

Made by boiling the juice of raſpberry with a ſufficient quantity of double-refined ſugar to make a ſyrup.

607 Tormentil root. 156. Tormentilla erecta, E. TORMENTILLA, L. D. Tormentil root. See Botany, p. 199.

608 Common cinquefoil. 157. Potentilla reptans. PENTAPHYLLUM, L. Common cinquefoil. See Botany, p. 199.

609 Avens. 158. Geum urbanum. Avens or *herb bennet*. See Botany, p. 199. and the "Practical Synopſis."

This is conſidered as a good ſubſtitute for cinchona.

Class XIII. POLYANDRIA. Order 1. Monogynia.

610 Common red poppy. 159. Papaver Rhoeas. PAPAVER ERRATICUM, L. Common red poppy. See Botany, p. 204.

Officinal Preparation.

611 Syrup of red poppy. *a.* Syrupus Papaveris erratici, L. Syrup of red poppy.

Four pounds of the freſh flowers of red poppy are gradually mixed with four pints and a half of boiling diſtilled water in a water bath, conſtantly ſtirring them; they are then ſuffered to macerate for 12 hours, the juice is preſſed out and boiled with double-refined ſugar into a ſyrup.

Generally added to narcotic draughts, juleps, &c.

612 White poppy. 160. Papaver somniferum, E. PAPAVER ALBUM, L. D. White poppy. *Opium.* See Botany, p. 204.

To dilate on any article, however important, is now out of our power; we muſt therefore, beſides the above reference, refer our readers for the beſt accounts of opium, to Dr Crumpe's "Inquiry," Dr Duncan's Diſpenſatory, the "Practical Synopſis," and *Theſaurus Medicaminum.*

Officinal Preparations.

613 Purified opium. *a.* Opium purificatum, L. D. Purified opium.

A pound of opium, cut into ſmall pieces, is digeſted with 12 pints of proof ſpirit, with a gentle heat, till as much as poſſible of the opium is diſſolved. The tincture is then filtered and diſtilled to a conſiſtence proper for making into pills or beating to powder.

Purified opium is commonly conſidered as rather weaker than crude opium; two grains of the ſofter maſs, and one grain and a half of the harder, being an ordinary doſe.

614 Opiate powder. *b.* Pulvis opiatus, E. L. Opiate powder.

By the London proceſs this is formed by mixing together a dram of hard purified opium in powder, and nine drams of burnt and prepared hartſhorn. The Edinburgh powder is prepared of one part of opium, and nine parts of prepared carbonate of lime, rubbed together to a very fine powder.

Ten grains of theſe powders contain one grain of opium; but the Edinburgh powder is rather the ſtronger.

er. They are uſeful when it is required to adminiſter opium in very ſmall doſes.

615 piate pills. *c.* Pilulæ Opii, L. PILULÆ OPIATÆ, E. Opium pills. *Opiate* or *thebaic pills.*

The London pills are prepared of two drams of hard purified opium in powder, and one ounce of extract of liquorice, beaten together till they are perfectly united. The Edinburgh pills are formed of one part of opium, and ſeven of extract of liquorice, ſoftened ſeparately with diluted alcohol, beaten into a pulp and mixed, and then beaten with two parts of pounded Jamaica pepper into an uniform maſs.

The London pills contain two grains of opium, and the Edinburgh one grain, in 10 of the maſs.

616 xtract of ium. *d.* Extractum Opii, D. Extract of opium.

Prepared by diſſolving two ounces of purified opium in one pound of boiling water, ſtraining the liquor, and adding, while warm, one pound of cold diſtilled water, expoſing to the air for two days, filtering again, and evaporating to the proper conſiſtence of an extract.

617 roches of quorice ith opium. *e.* Trochisci Glycyrrhizæ cum Opio, E. TROCHISCI GLYCYRRHIZÆ COMPOSITI. D. Troches of liquorice with opium. *Compound troches of liquorice.*

The Edinburgh troches are formed by triturating two drams of opium, with half an ounce of tincture of tolu; then adding by degrees five ounces of extract of liquorice, ſoftened in warm water, and eight ounces of common ſyrup; and laſtly, five ounces of powdered gum arabic, and drying the maſs till it is of a conſiſtence to form troches, weighing ten grains each. The Dublin formula directs two drams of purified opium to be triturated with a dram of balſam of Peru, and three drams of tincture of myrrh, till they are intimately mixed; then to be added two drams of tincture of tolu, and nine ounces of extract of liquorice, ſoftened in warm water; when the whole is to be well beaten together, and, with the addition of five ounces of powdered gum arabic, formed into troches, weighing ten grains each.

Theſe troches are intended to allay irritation in tickling coughs. About ſeven and a half of the Edinburgh, and ſix of the Dublin troches, contain about one grain of opium.

618 piate elec-tuary. *f.* Electuarium Opiatum, E. CONFECTIO OPIATA, L. Opiate electuary. *Opiate confection.*

The Edinburgh electuary is formed by mixing together ſix ounces of aromatic powder, three ounces of finely powdered ſnakeroot, half an ounce of opium, diffuſed in a ſufficient quantity of Spaniſh white wine, and one pound of the ſyrup of ginger. The London confection is prepared of ſix drams of hard purified opium in powder; of long pepper, ginger, and carraway ſeeds powdered, each two ounces; and ſyrup of white poppy boiled to the conſiſtence of honey, three times the weight of the other ingredients. The opium is firſt mixed with the ſyrup, then the other powders added, and the whole intimately blended.

Theſe are intended as ſtimulating compoſitions of opium. Thirty-ſix grains of the London, and 43 of the Edinburgh preparation, contain about one grain of opium.

619 Electuary of catechu. *g.* Electuarium mimosæ Catechu, E. ELECTUARIUM CATECHU COMPOSITUM, D. CONFECTIO JAPONICA. Electuary of catechu. *Japonic confection.*

Theſe electuaries are prepared of four ounces of extract of catechu powdered, three ounces powdered kino, one ounce of cinnamon, and the ſame of nutmeg in powder, one dram and a half of opium, diffuſed in Spaniſh white wine, and two pounds and a quarter of ſyrup of red roſes boiled to the conſiſtence of honey (E.); or 14 ounces of ſyrup of ginger, and the ſame of the ſyrup of orange peel, boiled to the conſiſtence of honey (D.).

Powerful aſtringents, given in diarrhœas. Ten ſcruples contain about one grain of opium, and the uſual doſe is a tea ſpoonful frequently repeated.

620 Tincture of opium. *h.* Tinctura Opii, E. L. D. TINCTURA THEBAICA. Tincture of opium. *Thebaic tincture. Liquid laudanum.*

The London and Dublin tinctures are made by digeſting two ounces of opium in two pounds of diluted alcohol, 14 days, and filtering. The London tincture is made by digeſting ten grains of powdered purified opium in a pint of proof ſpirit for ten days.

Theſe tinctures are conſidered as of nearly equal ſtrength. Doſe as narcotics, 25 or 30 drops; as antiſpaſmodics, they are, like the ſolid opium, given in much larger does.

621 Camphorated tincture of opium. *i.* Tinctura Opii camphorata, L. D. ELIXIR PAREGORICUM. Camphorated tincture of opium. *Paregoric elixir.*

Prepared by digeſting one dram of hard purified opium, one dram of flowers of benzoin, two ſcruples of camphor, and one dram of eſſential oil of aniſeeds, in two pints of proof ſpirit, for ten days.

Half an ounce of this tincture contains about one grain of opium. Uſual doſe about one dram or two.

622 Ammoniated tincture of opium. *k.* Tinctura Opii ammoniata. Olim Elixir paregoricum, E. Ammoniated tincture of opium.

Made by digeſting three drams of benzoic acid, three drams of ſliced ſaffron, two drams of opium, and half a dram of volatile oil of aniſeeds, in ten ounces of ammoniated alcohol, ſeven days, in a cloſe veſſel.

An excellent antiſpaſmodic, ſtronger than the laſt. Doſe about one dram.

623 Syrup of opium. *l.* Syrupus Opii, D. Syrup of opium.

Made by diſſolving 48 grains of extract of opium in three pounds of boiling water, and adding a ſufficient quantity of double refined ſugar to make a ſyrup.

An excellent narcotic for children. According to Dr Duncan, an ounce of it contains about two grains and a half of opium.

624 Syrup of white poppies. *m.* Syrupus Papaveris somniferi, E. SYRUPUS PAPAVERIS ALBI, L. Syrup of white poppies.

The Edinburgh ſyrup is made by macerating two pounds of ſliced white poppy heads, freed from the ſeeds, in 30 pounds of boiling diſtilled water for 12 hours, boiling it to a third, and preſſing out the liquor, which is again boiled to one half, ſtrained, and formed into a ſyrup with four pounds of double refined ſugar. The proportions in the London proceſs are, three pounds and a half of poppy heads, eight gallons of water, and ſix pounds of ſugar.

A weak narcotic, not ſo certain as the laſt ſyrup.

625 Ladanum. 161. Cistus creticus, LADANUM, L. Ladanum. See Chemistry, N° 2460.

Officinal Preparation.

626 Compound ladanum plaſter. *a.* Emplastrum Ladani compositum. L. Compound ladanum plaſter.

Formed of three ounces of ladanum, one ounce of frankincenſe, powdered cinnamon and expreſſed oil of mace, each half an ounce, and one dram of eſſential oil of mint.

A warm ſtimulating plaſter.

Order 3. Trigynia.

627 Staveſacre. 162. Delphinium staphisagria. STAPHISAGRIA, L. D. Staveſacre.

Employed as an external application againſt vermin.

628 Blue monkshood. 163. Aconitum neomontanum. Aconitum napellus, E. ACONITUM, L. D. Blue monkshood, or aconite. See *Duncan's Diſpenſatory*.

Officinal Preparations.

629 Inſpiſſated juice of aconite. *a.* Succus spissatus Aconiti Napelli, E. Inſpiſſated juice of aconite.

Made from the freſh leaves of aconite in the uſual manner. Doſe from half a grain to three grains, twice or thrice a day.

Order 4. Tetragynia.

630 Winter's bark. 164. Wintera aromatica, E. Winter's bark. Similar to canella alba.

Order 6. Polygynia.

631 Black hellebore. 165. Helleborus niger, E. L. D. MELAMPODIUM. Black hellebore. See Botany, p. 210.

Officinal Preparation.

632 Tincture of black hellebore. *a.* Tinctura Hellebori nigri, E. L. D. Tincture of black hellebore.

Prepared by digeſting four ounces of black hellebore, and about half a dram of powdered cochineal, in two pounds and a half (E.), or two pints (L.), or two pounds (D.), of diluted alcohol, for about a week.

Much celebrated as an emmenagogue. Doſe about a tea ſpoonful.

633 Stinking hellebore. 166. Helleborus foetidus. HELLEBORASTER, L. Stinking hellebore. See Botany, p. 210.

Class XIV. DIDYNAMIA. Order 1. Gymnospermia.

634 Hyſſop. 167. Hyssopus officinalis, D. HYSSOPUS, D. Hyſſop. See Botany, p. 216.

635 Spearm 168. Mentha viridis. MENTHA SATIVA, L. D. Spearmint. See Botany, p. 217.

Officinal Preparations.

636 Mint w *a.* Aqua Menthæ sativæ, L. D. Mint water.

A gallon of water diſtilled from a pound and a half of mint.

637 Oil of mi *b.* Oleum volatile Menthæ Sativæ, L. D. Volatile oil of mint.

Diſtilled as other volatile oils.

c. Spiritus Menthæ sativæ, L. Spirit of mint.

A gallon of ſpirit diſtilled from a pound and a half of mint.

638 Peppermint. 169. Mentha Piperita, E. MENTHA PIPERIS, L. D. Peppermint. See Botany, p. 217.

Officinal Preparations.

639 Peppermint wat *a.* Aqua Menthæ Piperitæ, E. AQUA MENTHÆ PIPERITIDIS, L. Peppermint water.

640 Oil of peppermint. *b.* Oleum Volatile Menthæ Piperitæ vel Piperitidis, E. L. D. Oil of peppermint.

641 Spirit of peppermi *c.* Spiritus Menthæ Piperitæ vel Piperitidis, E. L. Spirit of peppermint.

All theſe are prepared in the ſame manner as ſimilar preparations of mint, poſſeſs ſimilar properties, but rather ſtronger. Doſe of the water, a wine glaſs full; of the oil, a drop or two; of the ſpirit, about an ounce.

642 Pennyroy 170. Mentha Pulegium, E. PULEGIUM, L. D. Pennyroyal. See Botany, p. 217.

Officinal Preparations.

643 Pennyroy water. *a.* Aqua Menthæ Pulegii, E. AQUA PULEGII, L. D. Pennyroyal water.

644 Oil of pennyroyal. *b.* Oleum volatile Menthæ Pulegii, E. OLEUM PULEGII, L. D. Oil of pennyroyal.

645 Spirit of pennyroy *c.* Spiritus Menthæ Pulegii, E. SPIRITUS PULEGII, L. Spirit of pennyroyal.

Diſtilled in the ſame manner, and poſſeſſing ſimilar properties with the preparations of mint.

646 Lavender flowers. 171. Lavandula spica, E. Lavendula, L. D. Lavender flowers. See Botany, p. 216.

Officinal Preparations.

647 Oil of lavender. *a.* Oleum volatile Lavandulæ Spicæ, E. OLEUM

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LEUM VOLATILE LAVENDULÆ. Volatile oil of lavender.

Diſtilled as other volatile oils.

648 pirit of lavender. *b.* SPIRITUS LAVANDULÆ SPICÆ, E. SPIRITUS LAVENDULÆ, L. D. Spirit of lavender.

Two pounds of freſh flowering ſpikes of lavender to eight pounds of alcohol, and ſeven pounds drawn off. (Ed.) A pound and half of lavender to a gallon, (L.) or nine pounds (D.) of proof ſpirit, and five pints, (L.) or five pounds (D.) drawn off.

A powerful ſtimulus, ſeldom employed internally, except in the following preparation.

649 ompound incture of avender. *c.* SPIRITUS LAVANDULÆ SPICÆ COMPOSITUS, E. SPIRITUS LAVENDULÆ COMPOSITUS, L. TINCTURA LAVENDULÆ COMPOSITA, D. Compound ſpirit of lavender. *Compound tincture of lavender.*

Made by digeſting an ounce (or half an ounce, L. D) of bruiſed cinnamon, half an ounce of bruiſed nutmegs, (two drams of bruiſed cloves, E.) and three drams (or an ounce L.) of red ſanders ſhavings, in three pounds (or three pints L.) of ſpirit of lavender, and a pound (or a pint L.) of ſpirit of roſemary, for about a week.

An excellent cordial in faintneſs or nauſea. Doſe from 20 drops to a dram.

650 yrian herb maſtich. 172. TEUCRIUM MARUM. MARUM SYRIACUM, L. D. Syrian herb maſtich. See BOTANY, p. 216.

651 Water germander. 173. TEUCRIUM SCORDIUM. SCORDIUM, L. Water germander. See BOTANY, p. 216.

652 White horehound. 176. MARRUBIUM VULGARE, E. L. D. White horehound. See BOTANY, p. 218.

653 riganum. 177. ORIGANUM VULGARE. ORIGANUM, L. D. *Origanum*, or *wild marjoram.* See BOTANY, p. 218.

Officinal Preparation.

654 il of origanum. *a.* OLEUM ORIGANI, L. D. Oil of origanum.

Diſtilled as other volatile oils. Much uſed in toothach.

655 weet maroram. 178. ORIGANUM MAJORANA, E. MAJORANA, L. D. Sweet marjoram. See BOTANY, p. 219.

656 Balm. 179. MELISSA OFFICINALIS, E. MELISSA, L. Balm. See BOTANY, p. 219.

Order 2. ANGIOSPERMIA.

657 Foxglove. 180. DIGITALIS PURPUREA, E. DIGITALIS, L. D. Foxglove. See BOTANY, p. 221. See alſo Withering on Foxglove, Duncan's Diſpenſatory, the Practical Synopſis, and the *Theſaurus Medicaminum.*

Doſe of the digitalis in ſubſtance about one grain, gradually increaſed.

Officinal Preparations.

658 nfuſion of oxglove. *a.* INFUSUM DIGITALIS PURPUREÆ, E. Infuſion of foxglove. Made by macerating a dram of the dried leaves of foxglove in eight ounces of boiling water, with an ounce of ſpirit of cinnamon, for four hours, and filtering.

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Uſed principally in dropſical complaints. Doſe half an ounce, or one ounce, twice a day.

659 Tincture of foxglove. *b.* TINCTURA DIGITALIS PURPUREÆ, E. Tincture of foxglove.

Prepared by digeſting an ounce of the dried leaves of foxglove in eight ounces of diluted alcohol, for ſeven days, and ſtraining through paper.

Much recommended in hæmoptyſis, and the early ſtages of conſumption, to diminiſh the frequency of the pulſe. Doſe from 10 to 20 drops, twice or thrice a day, gradually and cautiouſly increaſed.

CLASS XV. TETRADYNAMIA. Order 1. SILICULOSÆ.

660 Garden ſcurvygraſs. 181. COCHLEARIA OFFICINALIS, E. COCHLEARIA, D. COCHLEARIA HORTENSIS, L. Garden ſcurvygraſs. See BOTANY, p. 225.

Officinal Preparation.

661 Compound juice of ſcurvygraſs. *a.* SUCCUS COCHLEARIÆ COMPOSITUS, E. L. Compound juice of ſcurvygraſs.

According to the Edinburgh proceſs, this is prepared by mixing juice of ſcurvygraſs, juice of water creſſes, both freſh gathered, and juice of Seville oranges, of each two pounds, with half a pound of ſpirit of nutmeg; and after the feces have ſubſided, ſtraining the liquor. The London preparation is compoſed of two pints of juice of ſcurvygraſs, one pint of the juice of brooklime, and the ſame of that of water creſſes, and 20 ounces by meaſure of Seville orange juice, mixed and ſtrained as before.

A celebrated remedy in the ſcurvy, and cutaneous eruptions. Doſe from one to four ounces, twice or thrice a day.

662 Horſe-radiſh root. 182 COCHLEARIA ARMORACIA, E. RAPHANUS RUSTICANUS, L. D. Horſe-radiſh root. See BOTANY, p. 226.

Officinal Preparation.

663 Compound ſpirit of horſe-radiſh. *a.* SPIRITUS RAPHANI COMPOSITUS. L. D. Compound ſpirit of horſe-radiſh.

Two gallons or 18 pounds (D.) of proof ſpirit diſtilled from freſh horſe-radiſh root, and dried Seville orange peel, of each two pounds; freſh garden ſcurvy graſs four pounds, and bruiſed nutmegs an ounce.

Formerly much celebrated as an antiſcorbutic, and ſtimulant. Doſe from half an ounce to an ounce.

Order 2. SILIQUOSÆ.

664 Ladies ſmock. 183. CARDAMINE PRATENSIS, E. CARDAMINE, L. Ladies ſmock. See BOTANY, p. 226.

665 White muſtard ſeed. 183. SINAPIS ALBA, E. SINAPIS, D. White muſtard ſeed.

666 Common muſtard ſeed. 184. SINAPIS NIGRA. SINAPIS, L. Common muſtard ſeed. See BOTANY, p. 228.

Officinal Preparation.

667 Muſtard cataplaſm. *a.* CATAPLASMA SINAPEOS, L. CATAPLASMA SINAPIUM, D. Muſtard cataplaſm, or ſinapiſm.

Prepared of equal parts of powdered muſtard and crumb of bread, made into a proper conſiſtence with vinegar.

An excellent external ſtimulant application, in the low ſtage of acute diſeaſes, and in other caſes where ſlight external inflammation is indicated.

668 Water-creſſes. 185. SISYMBRIUM NASTURTIUM. E. NASTURTIUM AQUATICUM, L. D. Water creſſes. See BOTANY, p. 226.

CLASS XVI. MONODELPHIA. Order 1. TRIANDRIA.

669 Tamarinds. 186. TAMARINDUS INDICA, E. TAMARINDUS, L. D. Tamarinds. See BOTANY, 231.

Order 8. POLYANDRIA.

670 Common mallow. 187. MALVA SYLVESTRIS, E. MALVA, L. Common mallow. See BOTANY, p. 233.

Officinal Preparation.

a. DECOCTUM PRO ENEMATE, L. Decoction for clyſters.

671 Decoction for clyſters. Made by boiling one ounce of the dried leaves of mallow, and one ounce and a half of dried chamomile flowers, with a pint of water, and ſtraining.

672 Marſhmallow. 188. ALTHÆA OFFICINALIS, E. ALTHÆA, L. Marſhmallow root. See BOTANY, p. 233.

Officinal Preparations.

673 Decoction of marſhmallow. *a.* DECOCTUM ALTHÆÆ OFFICINALIS, E. Decoction of marſhmallow.

Made by boiling four ounces of dried marſhmallow root bruiſed, and two ounces of ſtoned raiſins of the ſun, in ſeven pounds of water to five pounds, ſtraining, and when the feces have ſubſided, pouring off the clear liquor.

A good emollient drink in inflammatory diſeaſes.

674 Syrup of marſhmallow. *b.* SYRUPUS ALTHÆÆ OFFICINALIS, E. SYRUPUS ALTHÆÆ, L. Syrup of marſhmallow.

Made by boiling one pound of freſh marſhmallow root, ſliced or bruiſed, in ten pounds or a gallon of water, to one half, and adding four pounds of double-refined ſugar to make a ſyrup.

A good emollient and demulcent in coughs, &c.

CLASS XVII. DIADELPHIA. Order 2. HEXANDRIA.

675 Common fumitory. 189. FUMARIA OFFICINALIS. FUMARIA, D. Common fumitory. See BOTANY, p. 237.

Order 3. OCTANDRIA.

676 Seneka root. 190. POLYGALA SENEGA, E. SENEKA, L. D. Seneka root. See BOTANY, p. 237.

Officinal Preparation.

677 Decoction of ſeneka. *a.* DECOCTUM POLYGALÆ SENEGÆ, E. Decoction of ſeneka.

Made by boiling one ounce of ſeneka root in two pounds of water to 16 ounces, and ſtraining.

Uſed in dropſy and rheumatic or arthritic complaints, and lately recommended in croup. Doſe about two ounces, three or four times a-day.

Order 4. DECANDRIA.

678 Red ſanders wood. 191. PTEROCARPUS SANTALINUS, E. SANTALUM RUBRUM, L. D. Red ſanders wood.

Employed chiefly to give colour to a tincture.

679 Dragon's blood. 192. PTEROCARPUS DRACO, E. SANGUIS DRACONIS, L. Dragon's blood. See CHEMISTRY, N° 2467.

Employed as an aſtringent, but now ſeldom uſed.

680 Common broom. 193. SPARTIUM SCOPARIUM, E. GENISTA, L. D. Common broom tops. See BOTANY, p. 237.

Officinal Preparation.

681 Extract of broom. *a.* EXTRACTUM GENISTÆ, L. Extract of broom.

Employed as a diuretic.

682 Cowhage. 194. DOLICHOS PRURIENS, E. DOLICHOS, D. Cowhage, or *cow-itch*. See BOTANY, p. 239.

683 Gum tragacanth. 195. ASTRAGALUS TRAGACANTHA, E. TRAGACANTHA, L. D. Gum tragacanth, or gum dragant.

This gum is a mere mucilage, and is employed as a demulcent.

Officinal Preparations.

684 Mucilage of gum tragacanth. *a.* MUCILAGO ASTRAGALI TRAGACANTHÆ, E. MUCILAGO TRAGACANTHÆ, L. MUCILAGO GUMMI TRAGACANTHÆ, D. Mucilage of gum tragacanth.

Made by macerating one ounce of powdered gum tragacanth in eight ounces of boiling water (E.), or half an ounce in ten ounces (L.), or one dram in eight ounces (D.), and diſſolving by ſubſequent trituration.

685 Compound powder of tragacanth. *b.* PULVIS TRAGACANTHÆ COMPOSITUS, L. Compound powder of tragacanth.

Prepared of powdered gum tragacanth, gum arabic, and ſtarch, of each half an ounce, rubbed into a powder with three ounces of double refined ſugar.

A demulcent powder, ſerviceable in tickling coughs, ſtrangury, ardor urinæ, violent mucous diarrhœa, and ſimilar diſeaſes.

686 Liquorice root. 196. GLYCYRRHIZA GLABRA, E. GLYCYRRHIZA,

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RHIZA, L. D. Liquorice root and extract of liquorice.

Uſed as an emollient and demulcent, in ſubſtance, in decoction, pills, electuaries, &c.

Officinal Preparation.

687 Extract of liquorice. *a.* EXTRACTUM GLYCYRRHIZÆ GLABRÆ, E. EXTRACTUM GLYCYRRHIZÆ, L. D. Extract of liquorice.

Prepared like other watery extracts.

688 Cabbage-tree bark. 197. GEOFFRÆA INERMIS, E. GEOFFRÆA, D. Cabbage-tree bark.

Lately introduced into this country from the Weſt Indies as an anthelmintic, in the form of decoction.

Officinal Preparation.

689 Decoction of cabbage-tree bark. *a.* DECOCTUM GEOFFRÆÆ INERMIS, E. Decoction of cabbage-tree bark.

Made by boiling one ounce of powdered cabbage-tree bark with a gentle fire in two pounds of water to one pound, and ſtraining. Doſe to children a table ſpoonful, to adults four; giving caſtor oil, and diluting with acidulated drinks, if unpleaſant ſymptoms ſhould ariſe.

690 Fenugreek ſeed. 198. TRIGONELLA FOENUM GRECUM. FOENUM GRECUM, L. Fenugreek ſeed. See BOTANY, p. 241.

CLASS XVIII. POLYADELPHIA. Order 3. ICOSANDRIA.

691 Seville orange. 199. CITRUS AURANTIUM, E. AURANTIUM HISPALENSE, L. D. Seville orange juice, peel, and leaves. See BOTANY, p. 243.

Officinal Preparations.

692 Syrup of orange peel. *a.* SYRUPUS CITRI AURANTII, E. SYRUPUS CORTICIS AURANTII, L. D. Syrup of orange peel.

Prepared by macerating ſix ounces, or eight ounces (L. D.), of the freſh outer rind of Seville oranges, with three pounds or five pints (L. D.) of boiling water, for 12 hours in a cloſe veſſel, and adding to the filtered liquor of double-refined ſugar four pounds, or enough to make a ſyrup.

Uſed chiefly in compoſition.

693 Orange peel water. *b.* AQUA CITRI AURANTII, E. Orange-peel water.

Ten pounds of water diſtilled from two pounds of freſh orange peel, after due maceration.

A pleaſant cordial water. Doſe two or three ounces.

694 Tincture of orange peel. *c.* TINCTURA AURANTII CORTICIS, L. D. Tincture of orange peel.

Made by digeſting three ounces of freſh orange peel in two pints or two pounds of proof ſpirit for three days. Doſe three or four drams to an ounce.

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695 Conſerve of orange peel. *d.* CONSERVA CITRI AURANTII, E. CONSERVA AURANTII HISPALENSIS, L. CONSERVA CORTICIS AURANTII, D. Conſerve of orange peel.

Prepared by beating the freſh rind of Seville oranges firſt by itſelf, and then with three times its weight of double-refined ſugar.

696 Lemon. 200. CITRUS MEDICA, E. LIMON, L. D. Lemon juice, peel, and eſſential oil. See BOTANY, p. 242.

Officinal Preparations.

697 Lemon peel water. *a.* AQUA CITRI MEDICÆ, E. Lemon peel water.

A gallon of water diſtilled from two pounds of freſh lemon peel.

A pleaſant aromatic water, ſimilar to orange water.

698 Syrup of lemon juice. *b.* SYRUPUS CITRI MEDICÆ, E. SYRUPUS LIMONIS SUCCI, L. D. Syrup of lemon juice.

Made by diſſolving five parts (E.) or five pounds (L.) or four pounds (D.) of double-refined ſugar, in three parts or two pints (L.) or two pounds (D.) of filtered lemon juice.

A pleaſant refrigerant ſyrup.

699 Inſpiſſated lemon juice. *c.* SUCCUS LIMONIS SPISSATUS, L. Inſpiſſated lemon juice.

Prepared in the ſame manner as the inſpiſſated juice of elder berries.

Employed chiefly as a refrigerant, eſpecially in bilious or remittent fevers.

Order 4. POLYANDRIA.

700 Cajeput. 201. MELALEUCA LEUCODENDRON, E. CAJEPUTA. Cajeput oil.

Uſed as an external ſtimulant in caſes of luxation, ſprains, and rheumatic and gouty affections.

701 St John's wort. 202. HYPERICUM PERFORATUM. HYPERICUM, L. St John's wort. See BOTANY, p. 243.

CLASS XIX. SYNGENESIA. Order 1. POLYGAMIA ÆQUALIS.

702 Dandelion. 203. LEONTODON TARAXACUM, E. TARAXACUM, L. D. Dandelion root and leaves.

Reputed a diuretic, but ſcarcely employed in modern practice.

703 Wild lettuce. 204. LACTUCA VIROSA, E. Wild lettuce. See BOTANY, p. 248. and Duncan's Diſpenſatory.

Officinal Preparation.

704 Inſpiſſated juice of wild lettuce. *a.* SUCCUS SPISSATUS LACTUCÆ VIROSÆ, E. Inſpiſſated juice of wild lettuce.

Prepared as other inſpiſſated juices; employed as a narcotic and diuretic, principally in dropſies proceeding from viſceral obſtructions. Doſe at firſt about three grains, gradually increaſed to 15 or more, twice or thrice a-day.

705 Burdock root. 205. Arctium Lappa, E. BARDANA, L. D. Burdock root.

Recommended as a diuretic, and given in the form of decoction in dropſies, &c.

706 Artichoke leaves. 206. Cynara scolymus, E. CINARA SCOLYMUS, E. D. Artichoke leaves.

Employed as a diuretic.

Order 2. Polygamia Superflua.

707 Southernwood. 207. Artemisia Abrotanum. ABROTANUM, L. Southernwood. See Botany, p. 251.

Officinal Preparation.

708 Decoction for fomentation. *a.* Decoctum pro fomento, L. Decoction for fomentations.

Prepared by boiling for a little, of the dried leaves of ſouthernwood, the dried tops of ſea wormwood, and dried chamomile flowers, each an ounce, with half an ounce of dried bay leaves, in ſix pints of diſtilled water, and ſtraining.

709 Sea-wormwood. 208. Artemisia maritima. ABSYNTHIUM MARITIMUM, L. D. Sea-wormwood. See Botany, p. 251.

Officinal Preparation.

710 Conſerve of ſea wormwood. *a.* Conserva Absynthii maritimi, L. Conſerve of ſea wormwood.

Prepared by beating the freſh tops of ſea wormwood with three times their weight of double refined ſugar, into a conſerve.

Employed as a tonic and ſtomachic in hypochondriaſis, epilepſy, &c. and as an anthelmintic. Doſe two drams to half an ounce, twice or thrice a day.

711 Wormſeed. 209. Artemisia Santonica, E. SANTONICUM, L. D. Worm ſeed.

Employed as an anthelmintic. Doſe from half a dram to a dram, twice a-day, in powder.

712 Common wormwood. 210. Artemisia Absinthium, E. ABSINTHIUM VULGARE, L. D. Common wormwood. See Botany, p. 251.

713 Tanſy. 211. Tanacetum vulgare, E. TANACETUM, L. D. Tanſy, leaves and flowers. See Botany, p. 251.

A good tonic and anthelmintic. Doſe half a dram to four drams in ſubſtance, or a table ſpoonful of the expreſſed juice.

714 Leopard's bane. 212. Arnica montana, E. L. D. German leopard's bane. See Botany, p. 253, and Duncan's Diſpenſatory.

715 Elecampane 213. Inula Helenium. INULA CAMPANA, L. D. Elecampane. See Botany, p. 253.

716 Golden rod. 214 Solidago Virga Aurea. VIRGA AUREA, D. Golden rod. See Botany, p. 253.

717 Colt's foot. 215. Tussilago farfara, E. TUSSILAGO, L. D. Coltsfoot. See Botany, p. 252.

718 Chamomile flowers. 216. Anthemis nobilis, E. CHAMÆMELUM. L. D. Chamomile flowers. See Botany, p. 254.

An excellent tonic and anthelmintic. Doſe in ſubſtance about a ſcruple in powder, or one dram in infuſion. Uſed externally as an emollient and diſcutient, in the form of clyſter or fomentation.

Officinal Preparations.

719 Decoction of chamomile. *a.* Decoctum Anthemidis nobilis, E. DECOCTUM CHAMÆMELI, D. Decoction of chamomile.

Prepared by boiling an ounce of chamomile flowers, and half an ounce of bruiſed carraway ſeeds, in five pounds of water (E.), or half an ounce of chamomile flowers with two drams of ſweet fennel ſeeds, in a pound of water (D).

Uſed as a carminative clyſter, or ſtimulant fomentation.

720 Extract of chamomile. *b.* Extractum Anthemidis nobilis, E. EXTRACTUM CHAMÆMELI, L. Extract of chamomile.

Prepared as other watery extracts. Doſe from a ſcruple to a dram, as a tonic and anthelmintic.

721 Pellitory of Spain. 217. Anthemis Pyrethrum, E. PYRETHRUM, L. D. Pellitory of Spain.

Uſed chiefly as a maſticatory in toothach.

Order 3. Polygamia Frustranea.

722 Bleſſed thiſtle. 218. Centaurea benedicta, E. CARDUUS BENEDICTUS, L. D. Bleſſed thiſtle. See Botany, p. 255.

Class XX. GYNANDRIA. Order V. Hexandria.

723 Virginian ſnakeroot. 219. Aristolochia Serpentaria, E. SERPENTARIA VIRGINIANA, L. D. Virginian ſnakeroot. See Duncan's Diſpenſatory, and the Synopſis Materiæ Medicæ.

Employed as a ſtimulant and tonic in low fevers, gangrene, &c. Doſe in ſubſtance 10 grains to 30.

Officinal Preparation.

724 Tincture of ſnake root. *a.* Tinctura Aristolochiæ Serpentariæ, E. TINCTURA SERPENTARIÆ, L. D. Tincture of ſnakeroot.

Prepared by digeſting two ounces of bruiſed Virginian ſnakeroot, and a dram of powdered cochineal, in two pounds and a half of diluted alcohol, for ſeven days (E.), or three ounces of ſnakeroot in two pints (L.), or two pounds (D.) of proof ſpirit, for ſeven or eight days. Doſe from two drams to half an ounce.

Order 10. Polyandria.

725 Wake robin. 220. Arum maculatum. ARUM, L. D. Arum, or wake robin.

Officinal Preparations.

726 Conſerve of arum. *a*. Conserva Ari, L. Conſerve of arum.

Made by beating a pound and a half of the freſh root of arum bruiſed, with a pound and a half of double refined ſugar, into a conſerve. Doſe about a dram.

Class XXI. MONOECIA. Order I. Monogynia.

727 Nutmeg tree. 221. Myristica moschata, E. MYRISTICA, L. D. Nutmeg tree.

728 Oil of mace. Nux Moschata. Nutmeg. Macis. Mace. Oleum Macis. Oil of Mace. See Duncan's Diſpenſatory.

Officinal Preparations.

729 Spirit of nutmeg. *a*. Spiritus Myristicæ Moschatæ, E. SPIRITUS NUCIS MOSCHATÆ, L. D. Spirit of nutmeg.

A gallon of ſpirit diſtilled from two ounces of well-bruiſed nutmegs. A good cordial. Doſe about half an ounce.

Order 4. Tetrandria.

730 Birch juice. 222. Betula alba, D. Birch juice.

A gentle diuretic.

731 Mulberries. 223. Morus nigra. Morus, L. Mulberries.

Officinal Preparations.

732 Syrup of mulberry juice. *a*. Syrupus Succi fructus Mori, L. Syrup of mulberry juice.

Prepared in the ſame manner as the ſyrup of black currant juice.

Employed as a refrigerant and demulcent.

733 Common ſtinging nettle. 224. Urtica dioica. URTICA, L. Common ſtinging nettle.

Uſed as a rubefacient to paralytic limbs, which are whipped with nettles.

Order 8. Polyandria.

734 Oak bark. 225. Quercus robur, E. QUERCUS, L. D. Oak bark.

A powerful aſtringent, employed in paſſive hemorrhages, diarrhœa, leucorrhœa, and ſimilar caſes. Doſe in ſubſtance 15 grains to half a dram of the powdered bark. Uſed externally by way of gargle, or lotion.

Officinal Preparation.

735 Extract of oak bark. *a*. Extractum Quercus, D. Extract of oak bark.

Prepared like other watery extracts. Doſe 10 grains to a ſcruple.

736 Gall nuts. 226. Quercus Cerris, E. L. D. GALLA. Gall-nuts. See Duncan's Diſpenſatory.

This is perhaps a more powerful aſtringent than oak bark, and is employed in ſimilar caſes.

737 Walnut. 227. Juglans regia. JUGLANS, L. Unripe walnuts.

Employed as a tonic and anthelmintic.

Order 10. Monodelphia.

738 Fir tree. 228. Pinus Abies. The fir tree.

739 Burgundy pitch. Pix Burgundica, E. D. Burgundy pitch.

Officinal Preparation.

740 Compound Burgundy pitch plaſter. *a*. Emplastrum Picis Burgundicæ, D. EMPLASTRUM PICIS COMPOSITUM, L. Compound Burgundy pitch plaſter.

Prepared of two pounds of Burgundy pitch, one pound of ladanum (L.) or of galbanum (D.), four ounces of yellow wax, the ſame of yellow reſin, and one ounce of expreſſed oil of mace.

A ſtimulating plaſter.

741 Frankincenſe. 229. Thus, L. Frankincenſe.

Officinal Preparation.

742 Compound plaſter of frankincenſe. *a*. Emplastrum Thuris compositum, L. Compound plaſter of frankincenſe.

Prepared of half a pound of frankincenſe, three ounces of dragon's blood, and two pounds of litharge plaſter, adding the reſins in powder to the melted litharge plaſter.

230. Pinus balsamea. Hemlock fir.

743 Balſam of Canada. Balsamum Canadense, E. L. D. Balſam of Canada.

744 Larch. 231. Pinus Larix. The larch.

745 Venice turpentine. 746 Oil of turpentine. Terebinthina Veneta, E. D. Venice turpentine. OLEUM VOLATILE PINI, E. OLEUM TEREBINTHINÆ, L. D. Oil of turpentine.

The oil of turpentine is directed by the London college to be prepared by diſtillation from common turpentine.

Officinal Preparation.

747 Purified oil of turpentine. Oleum volatile Pini purissimum, E. OLEUM TEREBINTHINÆ RECTIFICATUM, L. D. Purified oil of turpentine. *Spirit of turpentine.*

Diſtilled with the addition of water in well luted veſſels till the pureſt part of the oil has come over.

Stimulant and diuretic. Doſe from 10 to 30 drops. Mixed with an equal proportion of ether, it is much recommended in calculus. It is an excellent application to chilblains and recent burns.

232. Pinus Sylvestris.

748 Tar. A. Pix Liquida, E. D. Tar.

Officinal Preparation.

749 Tar ointment. *a*. Unguentum Picis, E. L. D. Tar ointment.

Prepared by melting together equal parts of tar and

Hiſtory of Simple and Officinal Medicines. mutton ſuet (L. D.), or five parts of tar and two parts of yellow wax (E.)

Eſteemed a good application in cutaneous diſeaſes, eſpecially *tinea capitis*.

750 Common turpentine. B. TEREBINTHINA VULGARIS, L. D. Common turpentine.

This, like other turpentines, is a ſtimulant and diuretic.

751 Yellow roſin. C. RESINA FLAVA, L. RESINA ALBA, D. Yellow roſin. *White roſin.*

Employed chiefly in making ſtimulating ointments and plaſters.

Officinal Preparations.

752 Reſinous ointment. *a.* UNGUENTUM RESINOSUM, E. UNGUENTUM RESINÆ FLAVÆ, L. D. Reſinous ointment. *Yellow baſilicon.*

Prepared by melting together eight parts of hog's lard, five of white roſin, and two of yellow wax (E.); or by melting together, of yellow roſin and yellow wax, each one pound, over a ſlow fire, adding a pint or ſeven ounces of olive oil, and ſtraining the mixture while hot (L. D.).

753 Cerate of yellow roſin. *b.* CERATUM RESINÆ FLAVÆ, L. D. Cerate of yellow roſin.

Prepared by melting together half a pound of the preceding ointment, and one ounce of yellow wax.

Theſe are intended as ſtimulating applications to ulcers that do not heal or ſuppurate properly.

754 Reſinous plaſter. *c.* EMPLASTRUM RESINOSUM, E. EMPLASTRUM LYTHARGYRI CUM RESINA, L. EMPLASTRUM ADHESIVUM. Reſinous plaſter. *Litharge plaſter with roſin. Adheſive plaſter.*

Prepared by melting five parts (E.), or three pounds (L.), of plaſter of ſemivitrified oxide of lead (*litharge plaſter*), and adding one part (E.) or half a pound (L.) of white or yellow roſin powdered.

Employed, ſpread on linen, to form adheſive plaſters; for keeping the edges of ulcers or recent wounds together; for giving mechanical ſupport to ulcerated limbs, or keeping on other dreſſings.

755 Palma chriſti ſeeds. 233. RICINUS COMMUNIS, E. L. D. Palma chriſti ſeeds. See BOTANY, p. 271.

Officinal Preparation.

756 Caſtor oil. *a.* OLEUM RICINI, L. Caſtor oil.

Expreſſed in the uſual manner from the huſked ſeeds.

Caſtor oil is ſeldom prepared in this country, being brought chiefly from the Weſt Indies. When cold drawn, it is milder, and leſs ſubject to become rancid, but it requires a larger doſe than the common oil. It is an excellent purgative, well ſuited to caſes of colic and worms, given either by the mouth, or by way of clyſter. Doſe in the former caſe about one ounce, and in the latter about two ounces.

234. CROTON ELEUTHERIA, E. CASCARILLA, L. D. Caſcarilla bark. Hiſtory o Simple a Officina Medicine

An excellent aromatic tonic. Doſe about half a dram, or two ſcruples, two or three times a-day. 757 Caſcarilla bark.

Officinal Preparations.

a. TINCTURA CASCARILLÆ, L. D. Tincture of caſcarilla. 758 Tincture of caſcarilla.

Prepared by digeſting four ounces of powdered caſcarilla bark in two pints or two pounds (D.) of proof ſpirit, for about a week, with a gentle heat. Doſe about one ounce; beſt in compoſition with decoction or infuſion of cinchona.

b. EXTRACTUM CASCARILLÆ, L. D. Extract of caſcarilla. 759 Extract of caſcarilla.

Prepared in the uſual way of making extracts. Doſe from 10 to 30 grains.

Order 10. SYNGENESIA.

235. MOMORDICA ELATERIUM, E. CUCUMIS AGRESTIS, L. D. Wild cucumber. 760 Wild cucumber.

Officinal Preparation.

a. SUCCUS SPISSATUS MOMORDICÆ ELATERII, E. ELATERIUM, L. Inſpiſſated juice of wild cucumber. *Elaterium.* 761 Elaterium.

This is prepared by ſlicing ripe wild cucumbers, expreſſing the juice very gently, and ſtraining it through a very fine hair ſieve; boiling it a little, and ſetting it by for ſome hours, till the thicker part has ſubſided. The ſupernatant fluid is then poured off, and ſeparated by filtering from the thicker matter, which is to be dried and kept for uſe.

A violent cathartic, employed in dropſy. Doſe half a grain to one grain.

236. CUCUMIS COLOCYNTHIS, E. COLOCYNTHIS, L. D. Colocynth or bitter apple. See BOTANY, p. 271. 762 Colocynth.

Officinal Preparation.

a. EXTRACTUM COLOCYNTHIDIS COMPOSITUM, L. Compound extract of colocynth. 763 Compoun extract o colocynth

Prepared by digeſting ſix drams of the pith of colocynth, cut ſmall, in a pint of proof ſpirit, with a gentle heat for four days, then diſſolving in the expreſſed tincture one ounce and a half of powdered ſocotorine aloes, and half an ounce of powdered ſcammony; and laſtly drawing off the ſpirit, and adding to the inſpiſſated extract, a dram of huſked cardamom ſeeds in powder.

A ſtrong cathartic and anthelmintic. Doſe from 5 to 30 grains.

237. BRYONIA ALBA. BRYONIA, D. Bryony root. See BOTANY, p. 271. where it is deſcribed under the name of *Bryonia dioica*. 764 Bryony root.

CLASS XXII. DIŒCIA. Order 2. DIANDRIA.

765 rack willow bark.

238. SALIX FRAGILIS. SALIX, D. Crack willow bark.

A good tonic, employed as a ſubſtitute for Peruvian bark. Doſe about one dram.

Order 5. PENTANDRIA.

766 hio turpentine.

239. PISTACIA TEREBINTHUS. TEREBINTHINA CHIA, L. Chio turpentine.

Not materially different from the other turpentines.

767 Maſtich.

240. PISTACIA LENTISCUS, E. MASTICHE, L. Maſtich. See BOTANY, p. 276. and CHEMISTRY, N° 2464.

768 Hop.

241. HUMULUS LUPULUS. Hop.

A good narcotic, which has been found an excellent ſubſtitute for opium. See an *Inaugural diſſertation de Humulo Lupulo*, lately printed at Edinburgh by Dr de Roches, and Kirby's tables, p. 94.

Order 6. HEXANDRIA.

769 arſaparilla oot.

242. SMILAX SARSAPARILLA, E. SARSAPARILLA, L. D. Sarſaparilla root.

A ſlight diaphoretic, of little efficacy.

Officinal Preparations.

770 Decoction of ſarſaparilla.

a. DECOCTUM SMILACIS SARSAPARILLÆ, E. DECOCTUM SARSAPARILLÆ. L. D. Decoction of ſarſaparilla.

Prepared by digeſting ſix ounces of ſliced ſarſaparilla root in eight pints of diſtilled water, for two hours, in a heat of about 195°; then taking out the root and bruiſing it, repeating the maceration; then boiling the liquor down to four pints, preſſing it out, and ſtraining the decoction.

771 Compound decoction of ſarſaparilla.

b. DECOCTUM SARSAPARILLÆ COMPOSITUM, L. D. Compound decoction of ſarſaparilla.

Made by macerating ſix ounces of ſliced and bruiſed ſarſaparilla root, one ounce of the bark of ſaſſafras root, in ten pints of diſtilled water, for ſix hours; then boiling down to five pints, adding towards the end three drams of mezereon, and ſtraining the decoction.

A good diet drink, but ſcarcely ſuperior to the compound decoction of guaiacum. Doſe from four to eight ounces, three or four times a-day.

Order 12. MONADELPHIA.

772 Juniper berries.

243. JUNIPERUS COMMUNIS, E. JUNIPERUS, L. D. Juniper berries. See BOTANY, p. 278.

Officinal Preparations.

773 Oil of juniper.

a. OLEUM VOLATILE JUNIPERI COMMUNIS, E. OLEUM JUNIPERI BACCÆ, L. OLEUM BACCARUM JUNIPERI, D. Oil of juniper berries.

Diſtilled in the ſame manner as other volatile oils.

Stimulant and diuretic. Doſe from three to ten drops.

774 Compound ſpirit of juniper.

b. SPIRITUS JUNIPERI COMMUNIS COMPOSITUS, E. SPIRITUS JUNIPERI COMPOSITUS, L. D. Compound ſpirit of juniper.

Nine pounds or a gallon of diluted alcohol diſtilled from one pound of well-bruiſed juniper berries, one ounce and a half of bruiſed carraway ſeeds, and the ſame of ſweet fennel ſeeds.

A good diuretic, but not ſuperior to common gin.

775 Olibanum.

244. JUNIPERUS LYCIA, E. OLIBANUM, L. D. Olibanum. See CHEMISTRY, N° 2487.

776 Savine.

244. JUNIPERUS SABINA, E. SABINA, L. D. Savine.

Reputed a ſpecific in uterine obſtructions, but gradually loſing its celebrity. Doſe in ſubſtance from fifteen grains to two ſcruples. Applied externally as an eſcharotic to venereal warts and ſimilar excreſcences.

Officinal Preparations.

777 Volatile oil of ſavine.

a. OLEUM VOLATILE JUNIPERI SABINÆ, E. OLEUM SABINÆ, D. Volatile oil of ſavine.

778 Extract of ſavine.

b. EXTRACTUM SABINÆ, L. D. Extract of ſavine.

Made like other extracts. Doſe from 10 to 30 grains, twice or thrice a-day.

779 Compound tincture of ſavine.

c. TINCTURA SABINÆ COMPOSITA, L. Compound tincture of ſavine.

Prepared by digeſting one ounce of extract of ſavine in a pint of tincture of caſtor, and half a pint of tincture of myrrh, till the extract is diſſolved.

Given as an emmenagogue, and as an antiſpaſmodic in hypochondriac affections. Doſe from 30 drops to a dram, twice or thrice a-day.

780 Pareira root.

246. CISSAMPELOS PAREIRA. PAREIRA BRAVA, L. Pareira brava root. See Duncan's Diſpenſatory.

CLASS XXIII. POLYGAMIA. Order 1. MONOECIA.

781 Gamboge.

247. STALAGMITIS CAMBOGIOIDES. GAMBOGIA, E. L. D. Gamboge. See Duncan's Diſpenſatory.

A violent cathartic and anthelmintic. Doſe from 1 or 2 grains to 10 or 15 grains. The latter chiefly in caſes of tænia.

782 White hellebore root.

248. VERATRUM ALBUM, E. HELLEBORUS ALBUS, L, D. White hellebore root. See BOTANY, p. 281.

Officinal Preparations.

783 Decoction of white hellebore.

b. DECOCTUM HELLEBORI ALBI, L. Decoction of white hellebore.

Made by boiling an ounce of powdered white hellebore

bore root in two pints of diſtilled water to one pint, and adding to the ſtrained liquor when cold two ounces of rectified ſpirit of wine.

Uſed as a lotion, diluted, if neceſſary, in the itch, and ſimilar cutaneous affections.

784 Tincture of white hellebore. *b.* TINCTURA VERATRI ALBI, E. Tincture of white hellebore.

Prepared by digeſting eight ounces of powdered white hellebore root in two pounds and a half of diluted alcohol for ſeveral days, and filtering though paper.

Employed occaſionally to aſſiſt the operation of emetics and cathartics, in ſome apoplectic and paralytic caſes, in mania; doſe in theſe caſes from half a dram to two drams. Employed alſo as a general ſtimulant or alterative in cutaneous diſeaſes, beginning with about two drops twice or three a day, and gradually increaſing the doſe.

785 Ointment of white hellebore. *c.* UNGUENTUM HELLEBORI ALBI, L. D. Ointment of white hellebore.

Prepared by mixing four ounces of ointment of hogs lard, with one ounce of powdered white hellebore, and one ſcruple of eſſential oil of lemon.

Uſed in ſimilar caſes with the decoction.

786 Catechu. 249. MIMOSA CATECHU, E. CATECHU, L. D. Catechu, or *Japan earth.* See BOTANY, p. 282.

A powerful aſtringent, employed in diarrhœas, uterine hemorrhage; and externally by way of lotion, or lozenge, for exulcerations and aphthous ulcers of the mouth. Doſe internally from 15 grains to two ſcruples.

Officinal Preparations.

787 Infuſion of catechu. *a.* INFUSUM MIMOSÆ CATECHU, E. INFUSUM JAPONICUM. Infuſion of catechu.

Prepared by macerating two drams and a half of powdered extract of catechu, and half a dram of bruiſed cinnamon, in ſeven ounces of boiling water, for two hours, in a covered veſſel, ſtraining the liquor and adding one ounce of ſimple ſyrup. Doſe from one to two ounces.

788 Tincture of catechu. *b.* TINCTURA MIMOSÆ CATECHU, E. TINCTURA CATECHU, L. TINCTURA JAPONICA. Tincture of catechu.

Prepared by digeſting three ounces of extract of catechu, and two ounces of bruiſed cinnamon, in two pounds and a half, or two pints (L.), of diluted alcohol, for ſeven or ten days, and ſtraining through paper. Doſe two or three drams.

c. ELECTUARIUM MIMOSÆ CATECHU, E. ELECTUARIUM CATECHU COMPOSITUM, D. CONFECTIO JAPONICA. Electuary of catechu. *Japonic Confection.* See preparations of opium.

789 Gum arabic. 250. MIMOSA NILOTICA, E. GUMMI ARABICUM, L. D. Gum arabic.

A dry mucilage, very uſeful as an emollient and demulcent.

Officinal Preparations.

790 Mucilage of gum arabic. *a.* MUCILAGO MIMOSÆ NILOTICÆ, E. MUCILAGO ARABICI GUMMI, L. D. Mucilage of gum arabic.

Prepared by diſſolving one part of powdered gum-arabic in about two of boiling water, and ſtraining.

791 Arabic emulſion. *b.* EMULSIO MIMOSÆ NILOTICÆ, E. EMULSIO ARABICA, D. Arabic emulſion.

Prepared, according to the Edinburgh proceſs, in the ſame manner as almond emulſion, with the addition of two ounces of gum arabic, added while beating the almonds. The Dublin emulſion is compoſed of two drams of powdered gum arabic, half an ounce of large almonds, three drams of double-refined ſugar, and one pound of decoction of barley.

Employed in the ſame caſes as almond emulſion.

792 Gum troches. *c.* TROCHISCI GUMMOSI, E. Gum troches.

Prepared of four parts of gum arabic, one of powdered ſtarch, and 12 of double refined ſugar, made into a maſs for troches with water.

Similar in uſes to the lozenges of ſtarch. See N° 369.

793 Pellitory of the wall. 251. PARIETARIA OFFICINALIS. PARIETARIA, L. Pellitory of the wall.

Order 2. DIOECIA.

794 Manna. 252. FRAXINUS ORNUS, E. L. D. Manna-aſh. *Manna.*

A mild purgative, well ſuited to children, but requiring ſome gentle aromatic to prevent griping. Doſe from a dram to half an ounce. Beſt in compoſition with ſenna.

Officinal Preparation.

795 Syrup of manna. *a.* SYRUPUS MANNÆ, D. Syrup of manna.

Prepared by macerating half an ounce of ſenna in one pound of boiling water for twelve hours in a covered veſſel, ſtraining the liquor, and adding one pound of manna, and one pound of double refined ſugar, to make a ſyrup.

This forms an excellent purgative for children.

796 Ginſeng root. 253. PANAX QUINQUEFOLIUM. GINSENG, L. Ginſeng root.

A Chineſe root, formerly much in repute as a ſtimulant, but now out of faſhion.

Order 3. TRIOECIA.

797 Figs. 254. FICUS CARICA, E. CARICA, L. D. Figs. See BOTANY, p. 282.

A gentle laxative, uſed chiefly in compoſition.

CLASS XXIV. CRYPTOGAMIA. Order 1. FILICES.

798 Male fern root. 255. POLYPODIUM FILIX MAS, E. FILIX, L.

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FILIX MAS, D. Male fern root. See BOTANY, p. 285.

This ſubſtance has been in great repute as an anthelmintic, eſpecially in caſes of tænia, given in doſes of a dram or two, followed by a ſtrong cathartic.

Order 3. ALGÆ.

Iceland liver-wort.

256. LICHEN ISLANDICUS. Iceland liver-wort.

This lichen has lately become a faſhionable remedy as an emollient, in pulmonary conſumption. It contains a great quantity of farinaceous and mucilaginous matter, and is therefore highly nutritious.

See Synopſis Materiæ Medicæ, and Theſaurus Medicaminum.

Order 4. FUNGI.

257. BOLETUS IGNIARIUS, E. AGARICUS. Female agaric.

This ſubſtance has been much celebrated as a ſtyptic, and before ligatures were ſo much employed, was uſed for reſtraining hæmorrhage from the mouths of bleeding veſſels during ſurgical operations. It is now out of uſe.

Order 5. PALMÆ.

258. COCOS BUTYRACEA. OLEUM PALMÆ, E. Mackaw tree. Palm oil. See BOTANY, p. [illegible].

A vegetable oily matter, employed as an external emollient.

CHAP. III. *MINERAL SUBSTANCES.*

SECT. I. *Water.*

802 Water.

259. AQUA. Water.

Though ſimple water forms no part of the Materia Medica in the Pharmacopœias, it is an article of ſo much importance, both in diet and medicine, that it ought not to be omitted here. We ſhall therefore make no apology for inſerting the following neat account of it, given by Dr Duncan in the later editions of his Diſpenſatory.

803 Snow or rain water pureſt.

"The chemical properties of water have been already enumerated. (See CHEMISTRY, N° 382. *et ſeq.*) The pureſt natural water is ſnow or rain water collected in the open fields; that which falls in towns, or is collected from the roofs of the houſes, is contaminated with ſoot, animal effluvia, and other impurities; although, after it has rained for ſome time, the quantity of theſe diminiſhes ſo much, that Morveau ſays that it may be rendered almoſt perfectly pure by means of a little barytic water, and expoſure to the atmoſphere. Rain water, after it falls, either remains on the ſurface of the earth, or penetrates through it, until it meets with ſome impenetrable obſtruction to its progreſs, when it burſts out at ſome lower part, forming a ſpring, or well. The water on the ſurface of the earth, either deſcends along its declivities in ſtreams, which gradually wearing channels for themſelves, combine to form rivers, which at laſt reach the ſea; or remains ſtagnant in cavities of conſiderable depth, forming lakes or ponds, or on nearly level ground, forming marſhes.

"The varieties of ſpring water are exceedingly numerous; but they may be divided into ſoft, which are ſufficiently pure to diſſolve ſoap, and to anſwer the purpoſes of pure water in general; and hard, which contain earthy ſalts, and decompoſe ſoap, and are unfit for many purpoſes, both in domeſtic economy, and in manufactures; and the ſaline, which are ſtrongly impregnated with ſaline ſalts. When ſpring waters poſſeſs any peculiar character, they are called *mineral waters*. River water is in general ſoft, as it is formed of ſpring water, which, by expoſure becomes more pure, and running ſurface water, which, although turbid from particles of clay ſuſpended in it, is otherwiſe very pure. Lake water is ſimilar to river water. The water of marſhes, on the contrary, is exceedingly impure, and often highly fetid, from the great proportion of animal and vegetable matters which is conſtantly decaying in them.

805 Mineral waters.

"Mineral waters derive their peculiarity of character, in general, either from containing carbonic acid or ſoda not neutralized, ſulphuretted hydrogen, purging ſalts, earthy ſalts, or iron; or from their temperature exceeding in a greater or leſs degree that of other ſurrounding bodies. The following are the moſt celebrated.

806 Warm ſprings.

"*a. Warm Springs.*—Bath, Briſtol, Buxton, Matlock, in England. Bareges, Vichy, &c. in France. Aix-la-Chapelle, Borſet, Baden, Carlſbad and Toeplitz in Germany; and Piſa, Lucca, Aix, and many others in Italy.

807 Carbonated ſprings.

"*b. Carbonated Springs.*—Pyrmont, Seltzer, Spa, Cheltenham, Scarborough.

808 Alkaline.

"*c. Alkaline.*—Carlſbad, Aix-la-Chapelle, Bareges, Toeplitz.

809 Sulphureous.

"*d. Sulphureous.*—Enghien, Lu, Aix-la-Chapelle, Kelbarn, Harrowgate, Moffat, and many in Italy.

810 Purging waters.

"*e. Purging.*—Sea water, Lemington Priors, Harrowgate, Lu, Carlſbad, Moffat, Toeplitz, Epſom, Seidlitz, Kelbarn, and all brackiſh waters.

811 Calcareous.

"*f. Calcareous.*—Matlock, Buxton, and all hard waters.

812 Chalybeate.

"*g. Chalybeate.*—Hartfell, Dunblane, Cheltenham, Pyrmont, Spa, Tunbridge, Bath, Scarborough, Vichy, Carlſbad, Lemington Priors.

813 Medical uſe of water.

"*Medical uſe.*—Water is an eſſential conſtituent in the organization of all living bodies; and as it is continually expended during the proceſs of life, that waſte muſt be alſo continually ſupplied; and this ſupply is of ſuch importance, that it is not left to reaſon or to chance, but forms the object of an imperious appetite. When taken into the ſtomach, water acts by its temperature, its bulk, and the quantity abſorbed by the lacteals. Water about 60 degrees, gives no ſenſation of heat or cold; between 60 degrees and 45, it gives a ſenſation of cold followed by a glow and increaſe of appetite and vigour; below 45, the ſenſation of cold is permanent and unpleaſant, and it acts as an aſtringent and ſedative; above 60, it excites nauſea and vomiting, probably by partially relaxing the fibres of the ſtomach, for when mixed with ſtimulating ſubſtances it has not theſe effects. In the ſtomach and in the inteſtines it acts alſo by its bulk, producing the effects ariſing from the diſtenſion of theſe organs; and as the inteſtinal gaſes conſiſt of hydrogen gas, either pure, or carbonated, or ſulphurated, or phoſphorated, it is probably in part decompoſed in them. It likewiſe dilutes the contents of the ſtomach and inteſtines, thus often diminishing their acrimony. It is abſorbed by the lacteals, increaſes the chyle and the blood, increaſes their fluidity, leſſens their acrimony, and produces *plethora ad volumen*. Its effects in producing plethora and fluidity are, however, very tranſitory, as it at the ſame time increaſes the ſecretion by the ſkin and kidneys. Indeed the effects of ſudorifics and diuretics depend in a great meaſure on the quantity of water taken along with them.

" Mineral waters have alſo a ſpecific action, depending on the foreign ſubſtances which they contain. It is however, neceſſary to remark, that their effects are in general much greater than might be expected from the ſtrength of their impregnations, owing probably to the very circumſtance of their great dilution, by which every particle is preſented in a ſtate of activity, while the lacteals admit them more readily than they would in a leſs diluted ſtate.

" Carbonic acid gas gives to the waters which are ſtrongly impregnated with it, a ſparkling appearance, and an agreeable degree of pungency. In its effects on the body it is decidedly ſtimulant, and even capable of producing a certain degree of intoxication. It is of great ſervice in bilious complaints, atony of the ſtomach, nauſea, and vomiting, and in all fevers of the typhoid type.

" Alkaline waters produce alſo a tonic effect on the ſtomach, but they are leſs grateful. They are particularly ſerviceable in morbid acidity of the ſtomach, and in diſeaſes of the urinary organs.

" Sulphureous waters are chiefly uſed in cutaneous and glandular diſeaſes. Their effects are ſtimulant and heating, and they operate by the ſkin or bowels.

" Purging waters derive their effects from the neutral ſalts they contain, eſpecially the muriates of ſoda, lime, and magneſia, and the ſulphates of ſoda and magneſia. They are much more frequently uſed for a length of time to keep the bowels open by exciting the natural action, than to produce full purging. Uſed in this way, inſtead of debilitating the patient, they increaſe his appetite, health, and ſtrength.

" Chalybeate waters are uſed as tonics. They ſtimulate conſiderably, and increaſe the circulation; but as they alſo generally contain neutral ſalts, they act as gentle laxatives. They are uſed in all caſes of debility, cachexia, chloroſis, fluor albus, amenorrhœa; and, in general, in what are called nervous diſeaſes.

814 External uſe of water.

" The external uſe of water depends almoſt entirely on its temperature, which may be

" 1. Greater than that of the body, or above 97° Fahr. The hot bath.

" 2. Below the temperature of the body.

a. From 97 to 85, the warm bath.
b. From 85 to 65, the tepid bath.
c. From 65 to 32, the cold bath.

815 Hot bath.

" The hot bath is decidedly ſtimulant in its action. It renders the pulſe frequent, the veins turgid, the face fluſhed, the reſpiration quick; increaſes animal heat, and produces ſweat. If the temperature be very high, the face becomes bathed in ſweat, the arteries at the neck and temples beat with violence, anxiety and a ſenſe of ſuffocation are induced; and if perſiſted in, vertigo, throbbing in the heart, and apoplexy, are the conſequences. It is very rarely employed in medicine, except where there are hot ſprings, as at Baden in Switzerland.

Hot bath ſeldom uſed in medicine.

" The Ruſſians and ſome other nations uſe the hot bath as an article of luxury.

" The effects of the affuſion of hot water have not been aſcertained, and it is probable, that when the heat is not ſo great as to deſtroy the organization of the ſkin, the very tranſient application of the water would be more than counteracted by the ſubſequent evaporation.

" With regard to the action ariſing from their temperature, all baths below 97° differ only in degree, as they all ultimately abſtract caloric from the ſurface, but with a force inverſely as their temperature.

816 Warm bath.

" The warm bath excites the ſenſation of warmth, partly becauſe our ſenſations are merely relative, and partly becauſe its temperature, though leſs than that of the internal parts of the body, is actually greater than that of the extremities, which are the chief organs of touch. But as water is a much better conductor of caloric than air, and eſpecially than confined air, as much caloric is abſtracted from the body by water which is a few degrees lower than the external temperature of the body, as by air of a much lower temperature. The warm bath diminiſhes the frequency of the pulſe, eſpecially when it has been previouſly greater than natural; and this effect is always in proportion to the time of immerſion. It alſo renders the reſpiration ſlower, and leſſens the temperature of the body, relaxes the muſcular fibre, increaſes the bulk of the fluids by abſorption, removes impurities from the ſurface, promotes the deſquamation and renewal of the cuticle, and ſoftens the nails and indurations of the ſkin.

" The ſtimulant power of the warm bath is therefore very inconſiderable, and its employment in diſeaſe will be chiefly indicated by preternatural heat of the ſurface, and frequency of the pulſe, rigidity of the muſcular fibre, and morbid affections of the ſkin. It has accordingly been found ſerviceable in many caſes of pyrexia, both febrile and exanthematous, in many ſpaſmodic diſeaſes, and in moſt of the impetigines. It is contraindicated by difficulty of breathing and internal organic affections, and ſhould not be uſed when the ſtomach is full.

817 Affuſion of warm water.

" The affuſion of warm water very generally produces a conſiderable diminution of heat, a diminiſhed frequency of pulſe and reſpiration, and a tendency to repoſe and ſleep; but its effects are not very permanent, and its ſtimulus is weak. It is recommended in febrile diſeaſes, depending on the ſtimulus of preternatural heat, and in thoſe attended with laborious reſpiration, and in the paroxyſms of hectic fever.

" As the tepid bath and affuſion produce effects intermediate between thoſe and cold water, it is unneceſſary to enumerate them.

818 Cold bath.

" The cold bath produces the ſenſation of cold, which gradually ceaſes, and is ſucceeded by numbneſs. It excites tremor in the ſkin, and ſhivering. The ſkin becomes pale, contracted, and acquires the appearance termed *cutis anſerina*. The fluids are diminiſhed in volume, the ſolids are contracted, the caliber of the veſſels is leſſened, and therefore numbneſs and paleneſs are induced, and the viſible cutaneous veins become ſmaller. There is a ſenſe of drowſineſs and inactivity, the joints become rigid and inflexible, and the limbs are

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are affected with pains and ſpaſmodic contractions. The reſpiration is rendered quick and irregular, the pulſe ſlow, firm, regular, and ſmall; the internal heat is at firſt diminiſhed, but gradually and irregularly returns nearly to its natural ſtandard; the extremities, however, continue cold and numb, or ſwollen and livid; the perſpiration is ſuppreſſed, and the diſcharge of urine is rendered more frequent and copious. If the cold be exceſſive on its application, long-continued violent ſhiverings are induced, the pulſe ceaſes at the wriſt, the motion of the heart becomes feeble and languid, there is a ſenſation of coldneſs and faintneſs at the ſtomach, and a rapid diminution of animal heat; and, at laſt, delirium, torpor, and death, are the conſequences. If the application of the cold bath be not carried to an exceſſive length, on emerging from the water the whole body is pervaded by an agreeable ſenſation of warmth, and the patient feels refreſhed and invigorated.

"The primary action of the cold bath is ſtimulant, and the degree of this action is in proportion to the lowneſs of its temperature. This opinion is indeed directly oppoſite to a theory of cold which has been advanced with the confidence of demonſtration. "Heat is a ſtimulus, cold is the abſtraction of heat; therefore cold is the abſtraction of ſtimulus, or is a ſedative." To this we might oppoſe another theory, equally ſyllogiſtic, and nearer the truth. Free caloric is a ſtimulus, cold is the ſenſation excited by the paſſage of free caloric out of the body; therefore cold is a ſtimulus. But, in fact, the action of cold is by no means ſo ſimple. It is complicated, and varies according to its intenſity, duration, and the ſtate of the ſyſtem to which it is applied. It acts at firſt as a ſtimulant, in exciting ſenſation; then as a tonic, in condenſing the living fibre; and, laſtly, however paradoxical it may appear, as a ſedative, by preventing that diſtribution of blood in the minute and ultimate veſſels, which is neceſſary for the exiſtence of ſenſibility and irritability, and by the abſtraction of the ſtimulus of heat.

"The cold bath may be ſo managed as to procure any of theſe effects, by regulating the length of time for which it is applied.

819 Cold affuſion.

"Cold affuſion, or the pouring of cold water over the body, is a very convenient way of applying the cold bath in many caſes. In this way cold is very ſuddenly applied to the ſurface, its operation is inſtantaneous and momentary; but may be continued by repeated affuſions for any length of time, and ſo as to produce its extreme effects. Where the effects of cold affuſion may be thought too ſevere, ſprinkling the body with cold water, or water and vinegar, may be ſubſtituted.

"The application of cold may be employed in fevers and febrile paroxyſms, when the heat is ſteadily above the natural ſtandard, and in many diſeaſes ariſing from relaxation and debility. It is contraindicated when the heat of the body is below 97°, when there is any notable perſpiration from the ſurface; and when there is general plethora. Debilitated habits ſhould be defended from the violence of its action, by covering the body with flannel.

"In yellow fever, eſpecially in thoſe caſes in which the heat of the ſkin is exceſſive, it is particularly uſeful, and ought to be long continued. In phrenitis and other local inflammations, it promiſes to be of advantage. In gout its effects are doubtful, being in ſome inſtances ſalutary, in others deſtructive. A criterion to enable us to determine when it ought or ought not to be reſorted to, is much wanted. In inflammatory rheumatiſm and rheumatic gout it is decidedly uſeful. It is of advantage in all the hemorrhagies and exanthemata; in tetanus, colic, cholera, hyſteria, mania, iſchuria, and in burns; and, in general, in all thoſe local diſeaſes in which ſolutions of acetate of lead, of muriate of ammonia, &c. are uſually employed; for the good effects of theſe depend entirely on the diminiſhed temperature.*"

For more reſpecting the utility of the cold affuſion, ſee Currie's "Medical Reports;" and for an excellent account of the effects and uſes of baths, ſee Marcard *de la Nature et de l'Uſage des Bains*, and a Treatiſe on on Cold and Warm Bathing, lately publiſhed at Edinburgh.

Officinal Preparation.

820 Diſtilled water.

a. AQUA DESTILLATA, E. AQUA DISTILLATA, L. D. Diſtilled water.

From 10 gallons of ſpring water, the London college directs four gallons to be drawn off, throwing away the firſt four pints that come over. The Dublin college directs 10 pounds to be diſtilled from 20 pounds, throwing away the firſt pound; while the college of Edinburgh directs water to be diſtilled in very clean veſſels till two-thirds have come over.

SECT. II. *Inflammable Subſtances.*

821 Sulphur.

26[illegible]. SULPHUR SUBLIMATUM, E. L. D. FLORES SULPHURIS. Sublimed ſulphur. *Flowers of ſulphur.*

For an account of the chemical nature and properties of ſulphur, ſee CHEMISTRY, Chap. ix.

As a medicine, ſulphur is employed both internally and externally. Internally it is given as a laxative, in the doſe of a dram or two, and as a diaphoretic in ſmaller doſes. Externally it is one of the moſt certain remedies for the itch, and ſome other cutaneous affections.

Officinal Preparations.

822 Waſhed ſulphur.

a. SULPHUR SUBLIMATUM LOTUM, E. D. FLORES SULPHURIS LOTI, L. Waſhed ſublimed ſulphur. *Waſhed flowers of ſulphur.*

Sublimed ſulphur is freed from the ſulphurous acid, which it has imbibed in the preparation, by boiling it for a little in four times its weight of water, and after pouring off the water in which it was boiled, waſhing it by repeated affuſions of cold water, till it no longer imparts acidity to the water.

Sublimed ſulphur ſhould always be waſhed before being uſed internally, otherwiſe it is very apt to diſorder the ſtomach and bowels.

823 Sulphurated oil.

b. OLEUM SULPHURATUM, E. L. Sulphurated oil.

Prepared by boiling one part of ſublimed ſulphur in eight of olive oil (E.), or one part to four parts (L.), in a large iron pot, till they are thoroughly united. Formerly much used as an expectorant in coughs, in a doſe of from ten to 40 drops, but now ſeldom uſed, except as an external application to foul ulcers.

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* Duncan's Diſpenſatory, 3d edit. p. 5[illegible].

c. Petroleum sulphuratum, L. Sulphurated petroleum.

Prepared in the ſame manner as the laſt, with oil of petroleum, and uſed for the ſame purpoſe.

Ointment [illegible] d. Unguentum Sulphuris, E. L. D. Ointment of ſulphur.

Prepared by mixing half a pound (L.) or five ounces (D.) of ointment of hogs-lard, with four ounces (L.) or three ounces (D.) of flowers of ſulphur; or four parts of hogs-lard, with one of ſublimed ſulphur, adding to each pound of the ointment, half a dram of volatile oil of lemons, or volatile oil of lavender (E.).

An excellent application in the itch. Ordinary quantity for an adult about four ounces, which ſhould be rubbed in at once.

826 Sulphuret of potaſh. e. Sulphuretum Potassæ, E. KALI SULPHURATUM, L. ALKALI VEGETABILE SULPHURATUM, D. HEPAR SULPHURIS. Sulphuret of potaſh. *Sulphurated kali. Sulphurated vegetable alkali. Liver of ſulphur.*

For the preparation and chemical properties of this ſubſtance, ſee Chemistry, N° 918.

Sulphuret of potaſh is ſeldom employed in medicine, except as a remedy in violent mercurial ſalivation, in which it is ſaid to be very effectual *. It has lately been much recommended, diſſolved in lime water, as an effectual external application in *tinea capitis*.

* See Kirby's [illegible] p. [illegible]

827 Precipitated ſulphur. f. Sulphur præcipitatum, L. D. Precipitated ſulphur.

Prepared by diſſolving ſix ounces (L.) or four ounces (D.) of ſulphuret of potaſh, in one pound and a half of diſtilled water, and adding diluted ſulphuric acid (L.) or diluted nitrous acid (D.), as long as there is any precipitation. The precipitate is then to be ſeparated by the filter, and waſhed till it has loſt all acidity, and then dried.

Similar in its nature to waſhed ſublimed ſulphur, but conſidered as rather milder.

828 Amber. 261. Succinum, E. L. D. Amber. See Chemistry, N° 2476.

Amber in its natural ſtate is not employed in medicine, except to make the following

Officinal Preparations.

a. Acidum Succini, E. SAL SUCCINI, D. L. Succinic acid. *Salt of amber.*

b. Oleum Succini, [illegible] D. Oil of amber.

For the preparation [illegible] properties of theſe ſubſtances, ſee Chemistry, [illegible]

c. Sal Succini [illegible] Purified ſalt of amber.

The London college [illegible] acid to be purified by boiling half a pound of it in a pint of diſtilled water, and ſetting aſide the ſolution to cryſtallize.

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Succinic acid is now ſcarcely employed in medicine.

832 Purified oil of amber. d. Oleum Succini purissimum, E. OLEUM SUCCINI RECTIFICATUM, L. D. Purified oil of amber.

The Edinburgh college directs oil of amber to be purified by diſtilling it in a glaſs retort with ſix times its quantity of water, till two-thirds of the water have paſſed into the receiver; when the pure volatile oil comes over, it is to be ſeparated from the water, and preſerved in veſſels cloſely ſtopped. The proceſſes of the other colleges do not materially differ from this.

Oil of amber is a powerful ſtimulant and antiſpaſmodic, uſeful in hyſterical and ſimilar diſorders. Doſe 10 or 12 drops. Uſed alſo externally in paralyſis and rheumatiſms.

833 Petroleum. 262. Bitumen petroleum, E. PETROLEUM, L. PETROLEUM BARBADENSE, D. Petroleum or rock oil. *Barbadoes tar.*

Officinal Preparation.

834 Oil of petroleum. a. Oleum Petrolei, L. Oil of petroleum.

Prepared by diſtilling petroleum in a ſand bath.

Employed as a ſtimulant and antiſpaſmodic. Doſe from 10 to 30 drops. Alſo uſed as an external ſtimulant in ſtrains and rheumatiſms.

Sect. III. *Acids.*

835 Sulphuric acid. 263. Acidum sulphuricum, E. ACIDUM VITRIOLICUM, L. D. Sulphuric acid. *Vitriolic acid. Oil of vitriol.*

For the preparation and chemical properties of ſulphuric acid, ſee Chemistry, Chap. x. Sect. 1.

Undiluted ſulphuric acid is ſeldom employed in medicine, except as an external ſtimulant and rubefacient, in combination with fatty ſubſtances.

Officinal Preparations.

836 Diluted ſulphuric acid. a. Acidum sulphuricum dilutum, E. ACIDUM VITRIOLICUM DILUTUM, L. D. Diluted ſulphuric acid. *Diluted vitriolic acid. Spirit of vitriol.*

One part of ſulphuric acid mixed with ſeven of water (E.), or one ounce with eight ounces of water (L.), or two ounces, with 14 ounces of water, (D.).

Diluted ſulphuric acid is employed as a refrigerant in fevers, aſtringent in homorrhages, and tonic in dyſpepſia. Doſe from 20 drops to a dram.

837 Aromatic ſulphuric acid. b. Acidum sulphuricum aromaticum, E. Aromatic ſulphuric acid. Elixir of vitriol.

Prepared by firſt mixing two pounds of alcohol with ſix pounds of ſulphuric acid, by gradually dropping the acid into the alcohol; digeſting this mixture with a very gentle heat in a cloſe veſſel, for three days; and adding one ounce and a half of bruiſed cinnamon, and one ounce of bruiſed ginger; digeſting again in a

cloſe

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cloſe veſſel, for ſix days, and filtering the tincture through paper in a glaſs funnel.

An excellent ſtimulant and tonic, well ſuited to dyſpeptic complaints. Doſe from 15 to 40 drops.

838 ulphate of otaſh. *c.* Sulphas Potassæ, E. KALI VITRIOLATUM, L. ALKALI VEGETABILE VITRIOLATUM, D. Sulphate of potaſh. *Vitriolated kali. Vitriolated vegetable alkali. Vitriolated tartar.*

For the nature and properties of this ſalt, ſee Chemistry, N° 925. *et ſeq.*

The Edinburgh college directs this ſalt to be prepared by an immediate combination of ſulphuric acid diluted with ſix times its weight of water, with as much pure carbonate of potaſh, diſſolved alſo in ſix times its weight of water, as is ſufficient to neutralize the acid. The ſalt is procured from the ſolution by evaporation and cryſtallization. The other colleges obtain this ſalt by diſſolving the ſaline maſs that remains after the diſtillation of nitrous acid, filtering and cryſtallizing as before.

Sulphate of potaſh is a mild purgative, and may be given in a doſe of four or five drams, but it requires a large quantity of water for its ſolution. It is employed chiefly to aſſiſt in the pulverization of opium, ſcammony, &c.

839 ulphate of otaſh with ulphur. *d.* Sulphas Potassæ cum Sulphure, E. SAL POLYCHRESTUS. Sulphate of potaſh with ſulphur. *Sal polychreſt.*

Prepared by mixing together equal parts of powdered nitrate of potaſh and ſublimed ſulphur; injecting the mixture gradually into a red hot crucible; and, when the deflagration ceaſes, allowing the ſalt to cool, and putting it into a veſſel that is to be cloſely ſtopped.

Similar in its effects with the laſt, but more eaſily prepared.

Sect. IV. *Alkalies and Alkaline Salts.*

840 arbonate f ſoda. 264. Carbonas Sodæ impurus, E. BARYLLA, L. D. Impure carbonate of ſoda. *Barilla. Fixed mineral alkali.*

Officinal Preparations.

841 arbonate f ſoda. *a.* Carbonas Sodæ, E. NATRON PREPARATUM, L. ALKALI FOSSILE MITE, D. Carbonate of ſoda. *Vitriolated natron. Mild foſſil alkali.*

Prepared by boiling impure carbonate of ſoda, bruiſed or powdered barilla, till all the ſalt is diſſolved, then filtering the liquor, and ſetting it by to cryſtallize.

For an account of the nature and properties of this ſalt, ſee Chemistry, N° 1085.

Employed in medicine chiefly as an antacid and lithontriptic. Doſe from 10 to 30 grains.

842 ater of ate of ſoda. *b.* Aqua supercarbonatis Sodæ, E. Water of ſupercarbonate of ſoda.

Prepared by paſſing a ſtream of carbonic acid gas through a ſolution of carbonate of ſoda, as was directed for preparing the water of carbonate of potaſh. See N° 315.

This preparation is ſuppoſed to be a powerful lithontriptic, and the occaſional uſe of it certainly appears to prevent the formation of uric acid. It may be drunk in the quantity of half a pint or a pint during the day.

c. Phosphas Sodæ, E. Phoſphate of ſoda. 843 Phoſphate of ſoda.

For the preparation and nature of this ſalt, ſee Chemistry, N° 1075, *et ſeq.*

An excellent laxative, preferable to moſt other ſaline cathartics, from its taſte being but little unpleaſant. Doſe from one to two ounces, which is beſt taken diſſolved in ſoup, beef tea, or gruel.

265. Nitras Potassæ, E. NITRUM, L. D. Nitrate of potaſh. *Nitre. Saltpetre.* See Chemistry, N° 942, *et ſeq.* 844 Nitrate of potaſh.

Nitrate of potaſh is uſed in medicine as a diaphoretic, diuretic, and refrigerant. Doſe from five to 20 grains.

Officinal Preparations.

a. Nitrum purificatum, L. Purified nitre. 845 Purified nitre.

Purified by ſolution in boiling water, filtration, and cryſtallization.

b. Acidum nitrosum, E. L. D. Nitrous acid. *Fuming ſpirit of nitre.* 846 Nitrous acid.

Prepared by decompoſing nitrate of potaſh by ſulphuric acid, in the manner mentioned under Chemistry, Chap. x. Sect. 3.

It is in this ſtate that the acid obtained from nitrate of potaſh is generally employed in medicine, though for certain purpoſes the nitric acid is to be preferred. Theſe acids are employed as refrigerants and diuretics, largely diluted, and in ſmall doſes, viz. from five to 20 drops, and alſo as tonics and general ſtimulants, as mentioned below. Externally they act as ſtimulants or eſcharotics, according to their ſtrength.

c. Acidum nitrosum dilutum, E. L. D. Diluted nitrous acid. *Aquafortis.* 847 Diluted nitrous acid.

Prepared by mixing equal weights of nitrous acid and water, taking care to avoid the noxious fumes. Uſes the ſame as of the laſt; but the diluted acid is better calculated for internal exhibition. Doſes about double thoſe of nitrous acid.

d. Acidum nitricum, E. Nitric acid. 848 Nitric acid.

Prepared by redistilling nitrous acid in a retort with an adopted receiver, with a very gentle heat, till the red portion has paſſed over, and the remaining acid has acquired the ſtate of nitric acid. See Chemistry as above.

This is the acid which has been ſo much recommended of late as a cure for ſyphilis, in which it is adminiſtered, diluted with water in the proportion of a dram to a pint, which is to be taken at intervals through the day, ſucking it through a quill or glaſs tube, to avoid injuring the teeth, and gradually augmenting the quantity as far as the ſtomach will bear. Though the advantages of nitric acid in ſyphilitic complaints appear to have been overrated, it is no doubt a valuable ſuccedaneum to mercury, and has, we believe, been of ſervice in caſes where mercurial preparations were inadmiſſible, or unſucceſsful. Nitric acid, in its [illegible]

[illegible], as procured by an extemporaneous decompoſition of nitre by ſulphuric acid, has been found of advantage as a fumigation in correcting putrid effluvia.

Ointment of nitrous acid. *e.* Unguentum Acidi nitrosi, E. Ointment of nitrous acid. *Oxygenated ointment.*

Prepared by gradually mixing ſix drams of nitrous acid with one pound of melted hog's lard, and continually agitating the mixture as it cools.

A good remedy in herpes, lepra, and ſome other cutaneous affections, and ſaid to have ſucceeded as a ſubſtitute for mercurial ointment.

Spirit of nitrous ether. *f.* Spiritus Ætheris nitrosi, E. L. LIQUOR ÆTHEREUS NITROSUS, D. Spirit of nitrous ether. *Ethereal nitrous liquor. Sweet ſpirit of nitre.*

About three parts of alcohol and one of nitrous acid, gradually mixed together, diſtilling over the ſpirit from a water bath.

Diuretic, ſtimulant, and tonic. Doſe 20 drops to a dram.

Muriate of ſoda. 266. Murias Sodæ, E. SAL MURIATICUS, L. SAL COMMUNIS, D. SAL MARINUS. Muriate of ſoda. *Sea ſalt. Common ſalt.* See Chemistry, N° 1046.

Muriate of ſoda is employed as a laxative and anthelmintic. In the former way it is uſually adminiſtered in clyſters; in the latter it is given by the mouth, in the doſe of half a dram to an ounce or more. Externally, when dried by heat, it is uſed as a ſtimulant and rubefacient.

Officinal Preparations.

Dried muriate of ſoda. *a.* Murias Sodæ exsiccatus, E. SAL COMMUNIS EXSICCATUS, D. Dried muriate of ſoda.

Muriate of ſoda is dried by roaſting it over the fire in a wide iron veſſel, with occaſional agitation, till it ceaſes to decrepitate.

Muriatic acid. *b.* Acidum Muriaticum, E. L. D. Muriatic acid. *Marine acid. Spirit of ſea ſalt.*

Prepared by decompoſing muriate of ſoda by ſulphuric acid, in the manner deſcribed under Chemistry, Chap. x. Sect. 5.

Muriatic acid is uſed in medicine as a refrigerant, diuretic, and ſtimulant. Doſe from 10 drops to 40 or 50. It is a good medicine in low fevers, largely diluted and ſweetened with ſugar. In its naſcent ſtate, as obtained by the extemporaneous decompoſition of muriate of ſoda by ſulphuric acid, it is an excellent fumigation, and in this reſpect is perhaps to be preferred to the nitric acid.

Sulphate of ſoda. *c.* Sulphas Sodæ, E. NATRON VITRIOLATUM, L. ALKALI FOSSILE VITRIOLATUM, D. SAL GLAUBERI. Sulphate of ſoda. *Vitriolated natron. Vitriolated mineral alkali. Glauber's ſalt.*

Uſually prepared by diſſolving and neutralizing the acidulous ſalt remaining after the preparation of muriatic acid, filtering the liquor, evaporating, and ſetting it aſide to cryſtallize. See Chemistry, N° 1030.

A good purgative, but not ſuited to all ſtomachs. Doſe from one to two ounces.

267. Subboras Sodæ. Boras Sodæ, E. BORAX, L. D. Subborate of ſoda. *Borax.* See Chemistry, N° 1067.

Sometimes given internally as a diuretic; but generally employed as a detergent to aphthous cruſts and ulcerations in the mouth and fauces, either by way of lotion, or made into a linctus with ſyrup or honey.

Sect. V. *Soaps.*

Spaniſh or Caſtile ſoap. 268. Sapo Hispanus. SAPO, E. Spaniſh or Caſtile ſoap.

The Edinburgh and London colleges particularize the ſoap that ſhould be uſed in medicine, as prepared of olive oil and ſoda.

On the nature and properties of ſoap, ſee Chemistry.

Soap is employed both internally and externally. Internally it acts as a gentle laxative, and is ſuppoſed to poſſeſs lithontriptic powers. In this latter way it has been given in the quantity of from half an ounce to an ounce in the day. Excepting with this intention, it is ſeldom given alone. Externally it is uſed as a ſtimulant and detergent, under the various forms mentioned below.

Officinal Preparations.

557 Tincture of ſoap. *a.* Tinctura Saponis, E. LINIMENTUM SAPONIS COMPOSITUM, L. LINIMENTUM SAPONACEUM, D. Tincture of ſoap. *Compound liniment of ſoap. Saponaceous liniment. Opodeldoc.*

The Edinburgh tincture is prepared by digeſting four ounces of ſoap ſhavings in two pounds of alcohol for three days; then adding to the filtered liquor two ounces of camphor and half an ounce of volatile oil of roſemary, agitating them diligently. The London liniment is compoſed of three ounces of ſoap, one ounce of camphor, and one pint of ſpirit of roſemary; that of the Dublin college of two ounces of Caſtile ſoap, one ounce of camphor, eight ounces of alcohol, and the ſame of water, and two ſcruples of eſſential oil of roſemary.

Tincture of ſoap and opium. *b.* Tinctura Saponis et Opii, E. LINIMENTUM ANODYNUM. Tincture of ſoap and opium. *Anodyne liniment.*

Prepared in the ſame manner as the laſt with the addition, from the beginning, of one ounce of opium.

Theſe tinctures or liniments are excellent ſtimulant applications in caſes of ſprains, rheumatic pains, and ſimilar affections; and the latter of them has been found uſeful when applied to the tumid belly of children that are threatened with rickets.

Soap cerate. *c.* Ceratum Saponis, L. D. Soap cerate.

Prepared by boiling one pound of powdered litharge with a gallon or eight pounds (D.) of vinegar, over a ſlow fire, with conſtant agitation, till the mixture combines and thickens; then adding eight ounces of ſoap, 10 ounces of yellow wax, and a pint or 14 ounces (D.) of olive oil, and continuing the heat and agitation till they are united to form a cerate.

Soap plaſter. *d.* Emplastrum Saponis, L. EMPLASTRUM SAPONACEUM, E. D. Soap plaſter.

Prepared by mixing one part of ſoap with ſix of melted [illegible] melted with [illegible] plaster (L. D.), or one part of sliced [illegible] with four of plaster of semivitrified oxide of lead, and [illegible] melted together, E.

The[illegible] discutient applications.

SECT. VI. *Earths and Earthy Salts.*

861 Sulphate of baryta. 269. Sulphas Barytæ, E. TERRA PONDEROSA VITRIOLATA. BARYTES. Sulphate of baryta. *Vitriolated ponderous earth. Baryte.* See Chemistry, N° 1256, *et seq.*

Employed in medicine only for preparing the muriate of baryta.

862 Carbonate of baryta. 270. Carbonas Barytæ, E. TERRA PONDEROSA. Carbonate of baryta. *Heavy spar.* See Chemistry, as above.

Officinal Preparations.

863 Muriate of baryta. *a.* Murias Barytæ, E. Muriate of baryta.

Prepared by diſſolving carbonate of baryta broken into ſmall pieces in a mixture of one part of muriatic acid and three of water, filtering the liquor, evaporating and cryſtallizing. Where the carbonate of baryta cannot be procured, this ſalt is obtained from the ſulphate, by a very complex proceſs, for which ſee Duncan's Diſpenſatory, and Chemistry as above.

864 Solution of muriate of baryta. *b.* Solutio Muriatis Barytæ, E. Solution of muriate of baryta.

Prepared by diſſolving one part of cryſtallized muriate of baryta in three of water.

This has been recommended as a powerful ſtimulant and tonic, in a variety of diſeaſes. We believe it has been of ſervice in ſome caſes of ſcrophula. Doſe from five to ten drops, twice or thrice a-day.

865 Lime. 271. Calx, L. CALX VIVA, E. CALX RECENS USTA, D. Lime. *Quicklime.* See Chemisty, Chap. xiii. Sec. 1.

Lime in ſubſtance is ſcarcely employed in medicine, except by way of cauſtic, mixed with ſoft ſoap or potaſh.

Officinal Preparation.

866 Lime-water. *a.* Aqua Calcis, E. L. D. Lime water.

This is a ſaturated ſolution of freſh burnt quicklime in water. After being made, it ſhould be kept in veſſels that are not too large, and carefully ſtopped, that it may not imbibe carbonic acid from the air.

Lime-water is employed as an antacid and aſtringent, a tonic, and an anthelmintic. Doſe internally from two to four ounces. As an anthelmintic it is uſed in the way of clyſter, to deſtroy aſcarides. It is alſo employed externally as a ſtimulant and detergent.

867 Liniment of lime-water. *l.* Linimentum Aquæ Calcis. OLEUM LINI CUM CALCE, E. Liniment of lime, or *Linseed oil with lime.*

Prepared by mixing equal parts of linſeed oil and lime-water.

A uſeful application to recent ſcalds and burns.

272. Carbonas Calcis, E. Carbonate of lime. Carbonas Calcis mollior, E. CRETA, L. D. Chalk. Carbonas Calcis durior, E. MARMOR. Marble. See Chemistry, N° 12[illegible], *et seq.*

Carbonate of lime in its ſoft ſtate is much employed in medicine as an antacid, and when powdered or prepared, it is applied externally to ſcalds and burns, and to cancerous ſores.

Officinal Preparations.

a. Carbonas Calcis præparatus, E. CRETA PRÆPARATA, L. D. Prepared carbonate of lime. *Prepared chalk.*

This is chalk reduced to a very fine powder by trituration, levigation, diffuſion in water, filtration, and drying. Ordinary doſe as an antacid, from 15 grains to a dram.

b. Potio carbonatis Calcis, E. MISTURA CRETACEA, L. D. Chalk potion. Chalk potion.

Prepared, according to the Edinburgh college, by triturating an ounce of prepared carbonate of lime with two ounces of mucilage of gum arabic, and half an ounce of double-refined ſugar; then adding gradually two pounds and a half of water, and two ounces of ſpirit of cinnamon.

The London and Dublin mixture is prepared by mixing one ounce of prepared chalk, ſix drams of double-refined ſugar, one ounce of powdered gum arabic, with two pints or 30 ounces (D.), of diſtilled water.

Employed as an antacid, eſpecially in diarrhœa, accompanied by acidity in the inteſtinal canal. It may be taken *ad libitum.*

873 Troches of carbonate of lime. *c.* Trochisci carbonatis Calcis, E. TROCHISCI CRETÆ, L. Troches of carbonate of lime. *Troches of chalk.*

Prepared of four ounces of carbonate of lime, one ounce of gum arabic, one dram of nutmeg, and ſix ounces of double-refined ſugar, powdered together, and formed into a maſs with water, (E.); or, of four ounces of prepared chalk, two ounces of prepared crabs claws, half an ounce of cinnamon, and three ounces of double-refined ſugar, powdered and made into a maſs with mucilage of gum arabic (L.). Uſed as the preceding.

d. Pulvis carbonatis Calcis compositus, E. PULVIS CRETÆ COMPOSITUS, L. Compound powder of carbonate of lime. *Compound powder of chalk.*

Prepared of four ounces of prepared carbonate of lime, half a dram of nutmeg, and half a dram of cinnamon powdered together (E.); or, of half a pound of prepared chalk, four ounces of cinnamon, three ounces of tormentil, and the ſame of gum arabic, and half an ounce of long pepper powdered ſeparately, and mixed together (L.).

Uſed as antacids and tonics, in debility of the inteſtinal canal. Doſe from 15 to 30 grains.

e. Aqua Aeris fixi, D. Water impregnated with fixed air.

[illegible]

Prepared by paſſing a ſtream of carbonic acid gas ariſing from the decompoſition of three ounces of powdered white marble, and one half pound of diluted vitriolic acid, mixed with an equal quantity of water, through ſix pounds of pure ſpring water, in a Nooth's apparatus, with occaſional agitation.

An excellent tonic, refrigerant, and anti-emetic.

876 Solution of muriate of lime.

f. Solutio Muriatis Calcis, E. Solution of muriate of lime.

Prepared by diſſolving nine ounces of white marble broken to pieces, in ſixteen ounces of muriatic acid, mixed with eight ounces of water; digeſting for half an hour, pouring off the liquor, evaporating to dryneſs, diſſolving the reſiduum in 1½ times its weight of water, and filtering the ſolution.

An excellent tonic, uſeful in caſes of ſcrophula and ſchirrus. Doſe from 30 to 60 drops, twice or thrice a-day.

877 Sulphate of magnesia.

273. Sulphas Magnesiæ, E. MAGNESIA VITRIOLATA, L. D. SAL CATHARTICUS AMARUS. Sulphate of magneſia. *Vitriolated magneſia. Epſom ſalt.* See Chemistry, Chap. xiii. Sect. 4.

Uſed as a purgative, in a doſe of an ounce to an ounce and a half; as a tonic and gentle ſtimulant, in the doſe of a dram or two diluted conſiderably, twice a day.

Officinal Preparations.

878 Carbonate of magnesia.

a. Carbonas Magnesiæ, E. MAGNESIA ALBA, L. D. Carbonate of magneſia. *White magneſia.*

Prepared by decompoſing ſulphate of magneſia by an equal weight of carbonate of potaſh, each previouſly diſſolved in twice its weight of warm water, ſtrained, and then mixed, inſtantly adding eight times their weight of warm water; then boiling the liquor for a little with agitation, and when the heat is a little diminiſhed, ſtraining the liquor through linen, and well waſhing the powder that remains on the filter with warm water, and drying.

An excellent antacid, and in caſes of acidity, a laxative; alſo a good anti-emetic, where the ſickneſs is accompanied with acidity. Doſe from half a dram to a dram.

879 Burnt magnesia.

b. Magnesia, E. MAGNESIA USTA, L. D. Magneſia. *Burnt* or *calcined magneſia.*

This is pure magneſia, freed from carbonic acid, by keeping it in a red heat for two hours, and putting it up in cloſely ſtopped bottles.

Preferable to the former as an antacid, wherever the extrication of carbonic acid may be unpleaſant, by producing flatulency, eſpecially for children.

880 Troches of magnesia.

c. Trochisci Magnesiæ, L. Troches of magneſia.

Prepared by triturating together four ounces of burnt magneſia, two ounces of double-refined ſugar, and a ſcruple of powdered ginger, and forming a maſs for troches, with mucilage of gum arabic.

881

274. Supersulphas Aluminæ et Potassæ. SULPHAS ALUMINÆ, E. ALUMEN, L. D. Superſulphate of alumina and potaſh. *Alum.* See Chemistry, N° 1418, *et ſeq.*

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Alum is employed both externally and internally as an aſtringent and tonic. Internally it is given chiefly in hemorrhages; doſe from ten grains to a ſcruple.

Officinal Preparations.

882 Purified alum.

a. Alumen purificatum, L. Purified alum.

Prepared by boiling one pound of alum with one dram of chalk, in a pint of diſtilled water, ſtraining and cryſtallizing.

883 Dried ſulphate of alumina.

b. Sulphas Aluminæ exsiccatus, E. ALUMEN USTUM, L. Dried ſulphate of alumina. *Burnt alum.*

Alum is freed from its water of cryſtallization by melting it over the fire in an earthen or iron veſſel, and keeping it there till it ceaſes to boil.

Employed as an eſcharotic, to deſtroy fungous excreſcences.

884 Compound alum water.

c. Aqua Aluminis composita, L. Compound alum water.

Prepared by diſſolving half a dram of alum, and the ſame of vitriolated zinc, in four ounces of diſtilled water.

Employed externally as a ſtimulant or aſtringent, eſpecially in ophthalmia, and as an injection in gonorrhœa.

885 Compound powder of ſulphate of alumina.

d. Pulvis Sulphatis Aluminæ compositus, L. PULVIS STYPTICUS. Compound powder of ſulphate of alumina. *Styptic powder.*

Compoſed of four parts of ſulphate of alumina, and one part of kino, rubbed together to a fine powder.

An aſtringent. Doſe from 15 to 30 grains.

886 Alum curd

e. Cataplasma Aluminis, L. COAGULUM ALUMINOSUM, D. Alum cataplaſm. *Alum curd.*

Prepared by ſhaking any quantity of the white of egg with a piece of alum till a curd is formed.

A uſeful application to ſore and watery eyes, ſpread on linen, and applied at bed-time.

887 French bole.

275. Bolus gallicus, L. French bole.

A clayey earth, formerly employed as an antacid or abſorbent.

Sect. VII. *Metals and Metallic Preparations.*

888 Arſenious acid.

276. Acidum arseniosum. OXIDUM ARSENICI, E. Arſenious acid. *Oxide of arſenic. White arſenic.* See Chemistry, N° 1536, *et ſeq.*

For an excellent account of the effects of arſenic on the living body, the modes of obviating or counteracting them, and of its medical uſe, ſee Duncan's Diſpenſatory.

This ſubſtance is employed as a tonic in intermittent fever, but we conſider it as a dangerous remedy. For the mode of preparing and exhibiting it, ſee Duncan's [illegible] Duncan's Dispensatory as above, and [illegible] [illegible]

[illegible] Officinal Medicines.

889 Sulphuret of antimony. 876. Sulphuretum Antimonii, E. ANTIMONIUM, L. STIBIUM, D. Sulphuret of antimony.

For the natural history and chemical nature of this substance, see Mineralogy *Index*, and Chemistry, Chap xiv. sect. 12.

In its natural state, sulphuret of antimony is not employed in human medicine, except to form the following

Officinal Preparations.

890 Prepared sulphuret of antimony. *a.* Sulphuretum Antimonii præparatum, E. ANTIMONIUM PRÆPARATUM, L. STIBIUM PRÆPARATUM, D. Prepared antimony.

Ruduced to a very fine powder in the same manner as chalk, &c.

891 Oxide of antimony with sulphur. *b.* Oxidum Antimonii cum sulphure per nitratem Potassæ, E. CROCUS ANTIMONII, L. STIBIUM NITRO CALCINATUM, D. Oxide of antimony with sulphur. *Crocus of antimony.*

Prepared by injecting into a red hot crucible equal weights of sulphuret of antimony and nitrate of potash, powdered separately, and well mixed; separating the reddish matter that remains after the deflagration is over, from the whitish crust above it, and reducing the former to powder, which is to be well washed with hot water till it is tasteless. Scarcely employed in medicine, except as the basis of other preparations.

892 Vitrified oxide of antimony with sulphur. *c.* Oxidum Antimonii cum sulphure vitrificatum, E. ANTIMONIUM VITRIFICATUM, L. Vitrified oxide of antimony with sulphur. *Vitrified antimony. Glass of antimony.*

Prepared by gradually heating powdered sulphuret of antimony till it ceases to emit sulphurous fumes, and then melting it by an intense heat into a glass, which is to be poured out on a heated brass plate.

Employed by the London college as the basis of their antimonial wine.

893 Vitrified oxide of antimony with wax. *d.* Oxidum Antimonii vitrificatum cum cera, E. Vitrified oxide of antimony with wax.

Made by adding to one part of melted yellow wax, eight parts of vitrified oxide of antimony with sulphur, and roasting the mixture over a gentle fire with continual agitation for about a quarter of an hour, then pouring out the mixture, and, when cold, grinding it to powder.

This is similar to a medicine that was much esteemed by Sir John Pringle, as a remedy in dysentery. Dose from two or three to 20 grains, according to the age and strength of the patient.

894 Brown antimonial sulphur. *e.* Sulphur stibiatum fuscum, D. KERMES MINERALIS. Brown antimonial sulphur. *Kermes mineral.*

For the preparations and nature of this substance, see Chemistry, N° 1688.

895 Precipitated sulphuret of antimony. *f.* Sulphuretum Antimonii præcipitatum, E. SULPHUR ANT. PRÆCIP. L. SULPHUR STIBIATUM RUFUM, D. Precipitated sulphuret of antimony.

Prepared by [illegible] two [illegible] sulphuret of antimony in [illegible] mixed with three pounds of water, adding more, if necessary, in a covered iron pot, over a [illegible] hours, frequently stirring with an iron spatula, straining the liquor while hot, and precipitating the [illegible] by diluted sulphuric acid; then washing and drying the precipitate. See Chemistry, N° 1688.

Employed like the last as a diaphoretic. Dose two or three grains.

896 Muriate of antimony. *g.* Murias Antimonii, E. ANTIMONIUM MURIATUM, L. STIBIUM MURIATUM CAUSTICUM, D. Muriate of antimony. *Muriated antimony. Butter of antimony.* See Chemistry, p. 635.

Employed sometimes as a caustic, and for preparing the following substance.

897 Precipitated calx of antimony. *h.* Calx Stibii præcipitata, D. Precipitated calx of antimony. *Powder of algaroth.*

Prepared by adding eight ounces of muriated antimony to a filtered solution of eight ounces of mild vegetable alkali, in 40 pounds of water, washing and drying the precipitated powder.

898 Oxide of antimony with phosphate of lime. *i.* Oxidum Antimonii cum phosphate Calcis, E. PULVIS ANTIMONIALIS, L. PULVIS STIBIATUS, D. Oxide of antimony with phosphate of lime. *Antimonial powder.*

For the preparation and nature of this substance, see Chemistry, N° 1686. It is considered as nearly the same with *James's powder.*

An excellent diaphoretic. Dose from five to ten grains.

899 Tartrite of antimony and potash. *k.* Tartras Antimonii et Potassæ. TARTRIS ANTIMONII, E. ANTIMONIUM TARTARISATUM, L. TARTARUM STIBIATUM, D. Tartrate of antimony and potash. *Tartarized antimony. Stibiated tartar. Emetic tartar* or *tartar emetic.* See Chemistry, N° 1657, and Duncan's Dispensatory.

The Edinburgh and London colleges direct this to be prepared by boiling together three parts of oxide of antimony with sulphur, (see N° 891.) and four parts of super-tartrate of potash, for a quarter of an hour, in a glass vessel, straining the liquor, and setting it by to crystallize.

Emetic; dose two or three grains at once, or better half a grain or a grain at short intervals. Expectorant; dose half a grain, repeated at long intervals of two or three hours. Diaphoretic, in similar doses, combined with opium, &c. Alterative, in still smaller doses. Externally stimulant and rubefacient.

900 Wine of tartrite of antimony. *l.* Vinum tartritis Antimonii, E. VINUM ANTIMONII TARTARISATI, L. VINUM TARTARI [illegible], D. Wine of tartrite of antimony. *Wine of tartarized antimony.*

Prepared by dissolving tartrite of antimony and potash either immediately in Spanish white wine, or first in boiling water, and then adding the wine. The proportions

portions of the colleges vary; thoſe of Edinburgh being 24 grains of the ſalt to a pound of wine; of London and Dublin, 40 grains of ſalt to two ounces of boiling water, and eight ounces of wine; ſo that the former contains two grains in every ounce by weight, the latter four grains in every ounce by meaſure.

Doſes of the Edinburgh wine as an emetic, an ounce, or an ounce and half, or at intervals half an ounce; as an expectorant or diaphoretic, a dram or two. The London and Dublin wine may be taken in about half the above doſes.

901 Antimonial wine.

m Vinum Antimonii, L. Antimonial wine.

Prepared by digeſting an ounce of vitrified antimony in powder, in a pint and half of Spaniſh white wine, for 12 days, with frequent agitation and ſtraining through paper.

This preparation might be omitted, as it is neither ſo eaſily prepared nor ſo certain as the laſt.

902 Calcined antimony.

n. Antimonium calcinatum, L. Calcined antimony. *Diaphoretic antimony*. See Chemistry, N° 1690.

Formerly much employed as a diaphoretic in a doſe of from five to 30 grains; but ſince the introduction of James's powder and the analogous preparations, nearly diſuſed.

903 Compound antimonial pills.

o. Pilulæ Stibii compositæ, D. PILULÆ PLUMMERI. Compound antimonial pills. *Plummer's pills*.

Prepared by triturating together three ounces of precipitated ſulphur of antimony, and the ſame of mild muriate of mercury; then adding a dram of extract of gentian, and the ſame of hard Spaniſh ſoap, and forming a maſs with ſoap jelly.

Formerly in great repute as an alterative.

904 Mercury.

277. Hydrargyrum, D. HYDRARGYRUS, E. L. ARGENTUM VIVUM. Mercury. *Quickſilver*.

For an account of the chemical nature and properties of mercury, and the modes of aſcertaining its purity, ſee Chemistry, p. 642.

We ſhall firſt notice the ſeveral officinal preparations of mercury, and then ſubjoin a ſketch of its uſes and the caſes to which it is beſt adapted.

Officinal Preparations.

905 Purified mercury.

a. Hydrargyrum purificatum, D. HYDRARGYRUS PURIFICATUS, E. L.

The Edinburgh proceſs is to rub together four parts of quickſilver, and one part of iron filings, and diſtil from an iron veſſel.

906 Acetate of mercury.

b. Acetas Hydrargyri. ACETIS HYDRARGYRI, E. HYDRARGYRUM ACETATUM, D. HYDRARGYRUS ACETATUS, L. Acetate of mercury. *Acetated mercury*. See Chemistry, N° 1749.

Scarcely employed at preſent, except as an external ſtimulant or diſcutient.

907 Muriate of mercury.

c. Murias Hydrargyri, E. HYDRARGYRUM MURIATUM CORROSIVUM, D. HYDRARGYRUS MURIATUS, L. Muriate of mercury. *Corroſive muriated mercury*. *Corroſive ſublimate*. See Chemistry, N° 1736.

Prepared by boiling two pounds of purified quickſilver in two pounds and a half of ſulphuric acid, in a glaſs veſſel, over a ſand bath, to dryneſs, triturating the dried maſs when cold with four pounds of dried muriate of ſoda, then ſubliming in a glaſs cucurbit with a heat gradually increaſed, and ſeparating the ſublimed matter from the ſcoriæ.

Uſed as a ſialagogue; doſe one-eighth to one-fourth of a grain; as an external ſtimulus or eſcharotic to venereal ulcers, chancres, and herpetic eruptions, in the proportion of about a grain or more to the ounce of liquid.

908 Submuriate of mercury.

d. Submurias Hydrargyri, E. HYDRARGYRUM MURIATUM MITE SUBLIMATUM, D. CALOMELAS, L. Submuriate of mercury. *Sublimed mild muriate of mercury*. *Calomel*. See Chemistry, N° 1742, where the proceſs is much the ſame as that of the Edinburgh college.

Given in moſt caſes where mercury is indicated. Doſe, as a diaphoretic or alterative, about a grain; as a cathartic or anthelmintic, three to 10 grains; as a ſialagogue, one or two grains twice a day.

909 Precipitated ſubmuriate of mercury.

e. Submurias Hydrargyri præcipitatus, E. HYDRARGYRUM MURIATUM MITE PRÆCIPITATUM, D. HYDRARGYRUS MURIATUS MITE, L. Precipitated ſubmuriate of mercury. *Precipitated mild muriate of mercury*.

Procured by adding to a ſolution of half a pound of purified quickſilver in the ſame weight of diluted nitrous acid, a ſolution of four pounds and a half of muriate of ſoda in eight pounds of boiling water; waſhing and drying the precipitate.

Much the ſame in its effects and doſes as the foregoing.

910 White calx of mercury.

f. Calx Hydrargyri alba, L. White calx of mercury. *White precipitate*.

Prepared by diſſolving firſt half a pound of ſal ammoniac, and then half a pound of muriated mercury, in diſtilled water, adding to the mixed ſolution half a pound of water of prepared kali, filtering and waſhing and drying the precipitate. See Duncan's Diſpenſatory.

911 Ointment of white calx of mercury.

g. Unguentum Calcis Hydrargyri albæ, L. Ointment of white calx of mercury.

Prepared by mixing a dram of the foregoing with an ounce and a half of ointment of hog's lard.

Uſed to deſtroy vermin, and in ſome cutaneous eruptions.

912 Cinereous oxide of mercury.

h. Oxidum Hydrargyri cinereum, E. PULVIS HYDRARGYRI CINEREUS, D. Cinereous oxide of mercury.

Prepared by diſſolving four parts of purified quickſilver in five parts of diluted nitrous acid; then gradually adding 15 parts of diſtilled water, and pouring in a ſufficient quantity of water of carbonate of ammonia to precipitate the whole of the oxide, which is to be waſhed and dried.

A mild ſialagogue and alterative. Doſe from one to five grains. Uſed alſo as a fumigation in ſyphilitic eruptions, &c.

913 Ointment of cinereous oxide of mercury.

i. Unguentum Oxidi Hydrargyri cinerei, E. Ointment of cinereous oxide of mercury.

Compoſed of one part of the foregoing, and three parts of hog's lard. Uſed for mercurial inunction.

914 Quickſilver with chalk.

k. Hydrargyrus cum Creta, L. Quickſilver with chalk.

Prepared by triturating together three parts of purified quickſilver and five parts of prepared chalk, till the globules diſappear.

A mild alterative. Doſe from 10 to 30 grains.

915 Calcined mercury.

l. Hydrargyrum calcinatum, D. HYDRARGYRUS CALCINATUS, L. Calcined mercury. See Chemistry, N° 1709.

A violent ſialagogue. Doſe half a grain to a grain.

916 Red oxide of mercury.

m. Oxidum Hydrargyri rubrum per Acidum nitricum, E. HYDRARGYRUS NITRATUS RUBER, L. HYDRARGYRUM SUBNITRATUM, D. Red oxide of mercury *by nitric acid. Red nitrated mercury. Red precipitate.* See Chemistry, N° 1709.

Uſed as a ſtimulant or an eſcharotic in fungous ulcers, &c.

917 Ointment of red oxide of mercury.

n. Unguentum Oxidi Hydrargyri rubri, E. Ointment of red oxide of mercury.

Compoſed of one part of the foregoing reduced to fine powder, and eight parts of hog's lard.

918 Yellow ſubſulphate of mercury.

o. Subsulphas Hydrargyri flavus, E. HYDRARGYRUM SUBVITRIOLATUM, D. HYDRARGYRUS VITRIOLATUS, L. Yellow ſubſulphate of mercury. *Subvitriolated mercury. Turpeth mineral.* See Chemistry, N° 1720.

Employed chiefly as an errhine, mixed with liquorice powder or cephalic ſnuff.

919 Black ſulphuret of mercury.

p. Sulphuretum Hydrargyri nigrum, E. HYDRARGYRUM SULPHURATUM NIGRUM, D. HYDRARGYRUS CUM SULPHURE, L. Black ſulphuret of mercury. *Mercury with ſulphur. Ethiops mineral.*

Prepared by triturating together in a glaſs mortar with a glaſs peſtle, equal weights of purified quickſilver, and ſublimed ſulphur, till the globules of the former diſappear. See Chemistry, N° 1712.

Employed chiefly as an alterative in cutaneous diſeaſes and glandular affections. Doſe from five or 10 grains to a dram or more.

920 Red ſulphuret of mercury.

q. Hydrargyrum Sulphuratum rubrum, D. HYDRARGYRUS SULPHURATUS RUBER, L. Red ſulphuret of mercury. *Factitious cinnabar. Vermilion.* See Chemistry, N° 1713.

Uſed principally as a fumigation for venereal ulcers in the noſe, mouth, and throat, and as an ingredient in an ointment for the itch.

921 Mercurial pills.

r. Pilulæ Hydrargyri, E. L. D. Mercury pills.

Prepared by triturating an ounce of purified quickſilver with the ſame weight of conſerve of red roſes in a glaſs mortar, till the globules completely diſappear, adding occaſionally a little mucilage of gum arabic, then adding two ounces of ſtarch, and beating the whole with a little water into a maſs, to be immediately divided into 480 equal pills (E.). The London pills are compoſed of two drams of purified quickſilver, three drams of conſerve of roſes, and one dram of powdered liquorice; and the Dublin pills of three drams of quickſilver, the ſame of extract of liquorice, and a dram and a half of purified liquorice root.

Four grains of the Edinburgh maſs, three of the London, and two and a half of the Dublin, contain about one grain of mercury, ſo that the laſt are nearly twice as ſtrong as the firſt. Doſe of the Edinburgh pills as a ſialagogue, from three to ſix, once or twice a day.

922 Mercurial ointment.

s. Unguentum Hydrargyri, E. Mercurial ointment. *Blue ointment.*

Prepared by triturating together one part of quickſilver with a little hog's lard, till the globules diſappear; then adding one part of mutton ſuet, and as much hog's lard as, with the firſt quantity, is equal to three parts. Alſo formed with double or treble the quantity of mercury.

Uſed for mercurial inunction. Quantity to be uſed at once about four ſcruples or drams every other night, or every night.

923 Stronger mercurial ointment.

t. Unguentum Hydrargyri fortius, L. D. Stronger mercurial ointment.

Compoſed of two pounds of purified quickſilver, 23 ounces of prepared hog's lard, and an ounce of prepared mutton ſuet.

Quantity uſed at once, about two ſcruples or a dram.

924 Milder mercurial ointment.

u. Unguentum Hydrargyri mitius, L. D. Milder mercurial ointment. *Trooper's ointment.*

Formed of one part of the foregoing, and two of prepared hog's lard. Uſed chiefly to deſtroy vermin, or for ſome cutaneous affections.

925 Mercurial plaſter.

v. Emplastrum Hydrargyri, E. Mercurial plaſter.

Formed by melting one part of olive oil, and the ſame of white roſin together; and when the mixture is cold, rubbing with it three parts of quickſilver till the globules diſappear, afterwards adding by degrees ſix parts of melted plaſter of ſemivitrified oxide of lead, and mixing the whole carefully together.

926 Plaſter of gum ammoniac with mercury.

w. Emplastrum Ammoniaci cum Hydrargyro, L. Plaſter of gum ammoniac with mercury.

Prepared by triturating together three ounces of purified quickſilver, with about a dram of ſulphurated oil, till the globules diſappear, and then adding gradually one pound of ſtrained gum ammoniac melted.

n. Emplastrum Lithargyri cum Hydrargyro, L. Litharge plaster with mercury.

Compoſed of three ounces of purified quickſilver, about a dram of ſulphurated oil, and a pound of melted litharge plaſter.

These three laſt are employed as reſolvents and diſcutients, in caſes of venereal nodes and beginning indurations.

928 Ointment of nitrate of mercury. o. Unguentum Nitratis Hydrargyri, E. UNGUENTUM HYDRARGYRI NITRATI, L. D. UNGUENTUM CITRINUM. Ointment of nitrate of mercury. *Citrine ointment.*

Prepared by firſt diſſolving one part of quickſilver in two of nitrous acid, and beating up the ſolution in a glaſs mortar, with nine parts of olive oil, and three of hog's lard, previouſly melted together (or with 12 parts of hog's lard, L. D.) till the whole is formed into an ointment.

A powerful ſtimulant and detergent ointment, uſeful in inflammation and ulceration of the eyelids, and in cutaneous affections.

929 Milder ointment of nitrate of mercury. p. Unguentum nitratis Hydrargyri mitius, E. Milder ointment of nitrate of mercury.

Prepared in the ſame way as the laſt, except uſing three times the quantity of oil and lard.

Mercury, or ſome of its preparations, is exhibited, 1. As an errhine; the ſubſulphate of mercury; 2. As a ſialagogue, mercury in almoſt any form; 3. As a cathartic, the ſubmuriate of mercury; 4. As a diuretic, the oxides, the muriate, and the ſubmuriate, combined with other diuretics; 5. As a ſudorific, calomel conjoined with a ſudorific regimen; 6. As an emmenagogue; 7. As an aſtringent, muriate of mercury; 8. As a ſtimulant, muriate of mercury; 9. As an antiſpaſmodic; 10. As an anthelmintic.

With ſome of theſe views, mercury is frequently exhibited, 1. In febrile diſeaſes; in obſtinate agues. 2. In inflammatory diſeaſes, in indolent and chronic inflammations, eſpecially of the glandular viſcera, as the liver, ſpleen, &c. 3. In exanthematous diſeaſes, variola. 4. In profluvia; in dyſentery. 5. In ſpaſmodic diſeaſes; tetanus, triſmus, hydrophobia, &c. 6. In cachectic diſeaſes; anaſarca, aſcites, hydrothorax, hydrocephalus, &c. 7. In impetigines, ſcrofula, ſyphilis, lepra, icterus, &c. 8. In local diſeaſes; in caligo corneæ, amauroſis, gonorrhœa, obſtipatio, amenorrhœa ſuppreſſionis, tumours of various kinds, herpes, tinea, pſora, &c. *

For a more particular account of the medical effects and uſes of mercury, we refer our readers to Cullen's Materia Medica, vol. ii. The Practical Synopſis, vol. i. The *Theſaurus Medicaminum*, and Murray's Elements, vol. i.

930 Zinc. 278. Zincum, E. L. D. Zinc. See Chemistry, p. 640.

Officinal Preparations.

931 Oxide of zinc. a. Oxidum Zinci, E. ZINCUM CALCINATUM, L. CALX ZINCI, D. FLORES ZINCI. Oxide of zinc. *Flowers of zinc.* See Chemistry, N° 1756.

Employed as a tonic and antiſpaſmodic, chiefly in epilepſy. Doſe from three to 10 grains, three or four times a day.

932 Ointment of oxide of zinc. b. Unguentum oxidi Zinci, E. Ointment of oxide of zinc.

Compoſed of one part of the foregoing, and ſix parts of ſimple liniment.

Applied to the eye as an aſtringent, in caſes of ophthalmia, attended with debility and relaxation of the veſſels.

933 Sulphate of zinc. c. Sulphas Zinci, E. ZINCUM VITRIOLATUM, L. D. Sulphate of zinc. *Vitriolated zinc. White vitriol.* See Chemistry, N° 1764.

Employed internally as an emetic, in the doſe of from 10 to 30 grains, and as an aſtringent and tonic in a doſe of from two to five grains, ſeveral times a day. Externally as a ſtimulant and aſtringent, in the form of lotion, collyrium, or injection.

934 Solution of ſulphate of zinc. d. Solutio sulphatis Zinci, E. Solution of ſulphate of zinc.

Prepared by diſſolving 16 grains of ſulphate of zinc in eight ounces of water; then adding 16 drops of diluted ſulphuric acid, and filtering through paper.

Uſed in moſt caſes where the ſulphate of zinc is employed externally.

935 Water of vitriolated zinc with camphor. e. Aqua Zinci vitriolati cum Camphora, L. Water of vitriolated zinc with camphor.

Compoſed of half an ounce of vitriolated zinc, half an ounce by meaſure of camphorated ſpirit, and two pints of boiling water, mixed together, and filtered through paper.

Uſed for an aſtringent lotion and collyrium.

936 Solution of acetite of zinc. f. Solutio acetitis Zinci, E. Solution of acetite of zinc.

Prepared by mixing together a ſolution of one dram of ſulphate of zinc, in 10 ounces of diſtilled water, and a ſolution of four ſcruples of acetate of lead in 10 ounces of diſtilled water, allowing them to ſtand for ſome time at reſt, and filtering.

An excellent aſtringent collyrium.

937 Impure oxide of zinc. 279. Oxidum Zinci impurum, E. TUTIA, L. D. Impure oxide of zinc. *Tutty.* See Mineralogy *Index.*

Officinal Preparations.

938 Prepared impure oxide of zinc. a. Oxidum Zinci impurum præparatum, E. TUTIA PRÆPARATA, L. D. Prepared impure oxide of zinc. *Prepared tutty.*

Prepared in the ſame way as chalk, and other hard ſubſtances.

939 Ointment of impure oxide of zinc. b. Unguentum oxidi Zinci impuri, E. UNGUENTUM TUTIÆ, L. D. Ointment of impure oxide of zinc. *Tutty ointment.*

Compoſed of one part of the foregoing, and five parts of ſimple liniment (E.), or of any quantity of the foregoing, and as much ointment of ſpermaceti, or of hog's

Simple and Officinal Medicines.

[illegible] of hog's lard as is ſufficient to form a ſoft ointment (L. D.)

Uſed in ſimilar caſes with N° 932.

940 Impure carbonate of zinc. 280. CARBONAS ZINCI IMPURUS, E. LAPIS CALAMINARIS, L. D. Impure carbonate of zinc. *Calamine.* See MINERALOGY *Index*.

Officinal Preparations.

941 Prepared impure carbonate of zinc. *a.* CARBONAS ZINCI IMPURUS PRÆPARATUS, E. LAPIS CALAMINARIS PRÆPARATUS. L. D. Prepared carbonate of zinc. *Prepared calamine.*

Prepared as chalk, &c.

942 Cerate of impure carbonate of zinc. *b.* CERATUM CARBONATIS ZINCI IMPURI, E. CERATUM LAPIDIS CALAMINARIS, L. D. CERATUM EPULOTICUM. Cerate of impure carbonate of zinc. *Calamine cerate. Epulotic cerate. Brown cerate. Turner's cerate.*

Compoſed of one part of the foregoing, and five parts of ſimple cerate (E.), or of half a pound (L.), or one part (D.) of the foregoing, the ſame of yellow wax, and a pint (L.) or two parts (D.) of olive oil.

Employed chiefly as a dreſſing to ſores and ulcers.

943 Tin. 281. STANNUM, E. L. D. Tin. See CHEMISTRY, p. 653.

Officinal Preparations.

944 Powder of tin. *a.* STANNI PULVIS, L. D. Powder of tin.

Prepared by granulating melted tin by agitation in a covered wooden box rubbed with chalk; or by ſtirring while melted over the fire till it be reduced to a powder.

Employed as a mechanical anthelmintic, eſpecially in caſes of tænia and lumbricus. Doſe from two drams to half an ounce.

945 Lead. 282. PLUMBUM, E. L. D. Lead. See CHEMISTRY, p. 657.

946 White oxide of lead. OXIDUM PLUMBI ALBI, E. CERUSSA, L. D. White oxide of lead. *Ceruſe. White lead.* See CHEMISTRY, N° 1856.

Officinal Preparations.

947 Compound powder of ceruſe. *a.* PULVIS CERUSSÆ COMPOSITUS, L. Compound powder of ceruſe.

Compoſed of five ounces of ceruſe, half an ounce of ſarcocol, and half an ounce of gum tragacanth, powdered together.

Intended as an external diſcutient, but inferior for that purpoſe to the ſolutions of the ſalts of lead.

948 Ointment of white oxide of lead. *b.* UNGUENTUM OXIDI PLUMBI ALBI, E. UNGUENTUM ALBUM. Ointment of white oxide of lead. *White ointment.*

Compoſed of five parts of ſimple ointment, and one of white oxide of lead.

A cooling deſiccative ointment, forming a uſeful application in caſes of excoriation.

949 Superacetate of lead. *c.* SUPERACETAS PLUMBI. ACETIS PLUMBI, E. CERUSSA ACETATA, L. D. SACCHARUM SATURNI. Superacetate of lead. Acetite of lead. Sugar of lead. See CHEMISTRY, N° 1853.

Chiefly employed in ſolution as a refrigerant, ſedative, or aſtringent, by way of lotion, collyrium, or injection. Its internal uſe being highly dangerous, ought to be entirely abandoned.

950 Ointment of acetite of lead. *d.* UNGUENTUM ACETITIS PLUMBI, E. UNGUENTUM CERUSSÆ ACETATÆ, L. D. UNGUENTUM SATURNINUM. Ointment of acetite of lead. *Ointment of acetated ceruſe. Saturnine ointment.*

Compoſed of one part of the foregoing, and 20 parts of ſimple ointment (E.), or two drams of the foregoing, two ounces of white wax, and half a pint or half a pound of olive oil (L. D)

A uſeful refrigerant ointment.

951 Red oxide of lead. 283. OXIDUM PLUMBI RUBRUM, E. MINIUM, L. Red oxide of lead. *Red lead.* See CHEMISTRY, N° 1832.

This is now ſcarcely employed in medicine.

952 Semivitrified oxide of lead. 284. OXIDUM PLUMBI SEMIVITREUM, E. LITHARGYRUS, L. D. Semivitrified oxide of lead. *Litharge.* See CHEMISTRY, N° 1834.

Officinal Preparations.

953 Prepared litharge. *a.* LITHARGYRUS PRÆPARATUS, E. D. Prepared litharge.

Reduced to an impalpable powder by levigation, &c. in the uſual manner.

954 Water of acetated litharge. *b.* AQUA LITHARGYRI ACETATI, L. LIQUOR LITHARGYRI ACETATI, D. EXTRACTUM SATURNI. Water of acetated litharge. *Extract of lead.*

Prepared by mixing two pounds four ounces of litharge with a gallon of diſtilled vinegar, boiling to ſix pints with conſtant agitation, then ſetting it aſide till the feces have ſubſided, and then ſtraining.

955 Compound water of acetated litharge. *c.* LIQUOR LITHARGYRI ACETATI COMPOSITUS. D. AQUA LITHARGYRI ACETATI COMPOSITA, L. Compound water of acetated litharge.

Prepared by mixing a dram of the foregoing with a dram of proof ſpirit, and adding 14 ounces or a pint of diſtilled water.

This is intended as a refrigerant application, and is attended with effects ſimilar to thoſe of the ſuperacetate of lead, from which it however differs in its chemical nature.

956 Compound cerate of acetated litharge. *d.* CERATUM LITHARGYRI ACETATI COMPOSITUM, L. CERATUM LITHARGYRI ACETATI, D. Compound cerate of acetated litharge.

Prepared by rubbing half a dram of camphor with a little olive oil, and in the mean time adding gradually two ounces and a half of acetated litharge to a melted mixture of four ounces of yellow wax, and nine ounces of olive oil, ſtirring it till cold; and laſtly adding the camphorated oil. Formerly much employed as a refrigerant application, but differing in little, except in conſiſtence, from the other combinations of lead with fatty matters.

957 Plaſter of ſemivitrified oxide of lead. *e*. Emplastrum oxidi Plumbi semivitrei, E. EMPLASTRUM LITHARGYRI, L. D. EMPLASTRUM COMMUNE. Plaſter of ſemivitrified oxide of lead. *Litharge plaſter. Common plaſter. Diaculum plaſter.*

Prepared by boiling together over a ſlow fire, one part of ſemivitrified oxide of lead in powder, and about two parts of olive oil, adding a little hot water from time to time, and conſtantly agitating till the litharge and oil are uniformly mixed.

This plaſter has been long employed to cover excoriated ſurfaces, and to form plaſters for ſupporting the teguments in the neighbourhood of ſores and ulcers.

For the ill effects of lead as a poiſon, ſee Fothergill's "Cautions concerning Poiſons of Lead and Copper."

958 Iron. 285. FERRUM, E. L. D. Iron. See Chemistry, p. 664.

Officinal Preparations.

959 Purified filings of iron. *a*. Ferri Limaturæ purificatæ, E. Purified filings of iron.

Filings of iron are purified by placing a ſieve over them, and attracting the purer particles through the ſieve by means of a good magnet.

Sometimes employed internally as a tonic and anthelmintic, but their uſe is attended with an unpleaſant extrication of hydrogenous gas.

960 Purified black oxide of iron. *b*. Ferri oxidum nigrum purificatum, E. FERRI SQUAMÆ PURIFICATÆ. Purified black oxide of iron. *Purified ſcales of iron.*

This is a preparation of the ſcales of iron that collect about a ſmith's anvil, by the magnet.

A better medicine than the former, as it is not attended with the extrication of hydrogen gas. Doſe from five grains to a ſcruple.

961 Carbonate of iron. *c*. Carbonas Ferri, E. FERRI RUBIGO, L. D. Carbonate of iron. *Ruſt of iron.* See Chemistry, N° 1886, and 1929.

A good tonic, uſeful in general debility, and in uterine obſtructions dependent on debility. Doſe about a ſcruple, ſeveral times a day.

962 Water of aerated iron. *d*. Aqua Ferri aerati, D. Water of aërated iron.

This is an artificial chalybeate water, prepared in the ſame manner as, N° 875. with the addition of a coil of fine iron wire ſuſpended in the water.

An excellent tonic, forming a good ſubſtitute for the natural chalybeate waters. Doſe a glaſs or two, twice or thrice a day.

963 Wine of iron. *e*. Vinum Ferri. L. VINUM FERRATUM, D. Wine of iron. *Chalybeate wine.*

Prepared by digeſting four ounces of iron filings in four pints of Spaniſh white wine, for a month, with frequent agitation, and then ſtraining the liquor.

A tonic formerly much uſed in chlorotic caſes. Doſe from a dram to half an ounce.

f. Sulphas Ferri, E. FERRUM VITRIOLATUM, L. D. SAL MARTIS. Sulphate of iron. *Vitriolated iron. Salt of ſteel.* See Chemistry, N° 1903.

964 Sulphate of iron. A good tonic, but apt to diſagree with the ſtomach and bowels. Doſe from half a grain to one grain ſeveral times a day.

965 Tincture of muriate of iron. *g*. Tinctura muriatis Ferri, E. TINCTURA FERRI MURIATI, L. D. Tincture of muriate of iron.

The Edinburgh tincture is prepared by digeſting three ounces of purified black oxide of iron in powder, and ten ounces of muriatic acid, with a gentle heat; then adding, after the powder is diſſolved, as much alcohol as will make the whole liquor amount to two pounds and a half. The preparations of the other colleges do not materially differ from this. Doſe from 10 to 20 drops, twice or thrice a day.

966 Tartarized iron. *h*. Ferrum tartarisatum, L. *Tartarized iron.*

Prepared by mixing one pound of iron filings, and two pounds of powdered cryſtals of tartar, into a thick maſs with diſtilled water, expoſing them to the air for eight days in a wide glaſs veſſel, and then drying the matter in a ſand bath, and grinding to a very fine powder. See Chemistry, p. 671. Doſe from 10 to 30 grains.

967 Native ſulphate of iron. 286. Sulphas Ferri nativus. Native ſulphate of iron. *Green vitriol. Green copperas.*

Officinal Preparations.

968 Dried ſulphate of iron. *a*. Sulphas Ferri exsiccatus, E. Dried ſulphate of iron.

Prepared by expoſing any quantity of ſulphate of iron to the action of a moderate heat, in an unglazed earthen veſſel, till it becomes white and perfectly dry.

969 Red oxide of iron. *b*. Oxidum Ferri rubrum, E. Red oxide of iron. *Colcothar of vitriol.*

Prepared by expoſing the foregoing preparation to an intenſe heat till it is converted into a very red matter.

970 Plaſter of red oxide of iron. *c*. Emplastrum oxidi Ferri rubri, E. EMPLASTRUM ROBORANS. Plaſter of red oxide of iron. *Strengthening plaſter.*

Prepared by grinding eight parts of red oxide of iron with three of olive oil; and then adding them to a melted mixture of 24 parts of plaſter of ſemivitrified oxide of lead, ſix parts of white roſin, and three of yellow wax.

Uſed as an external application, ſpread on linen or leather, in weakneſſes of the back and loins.

971 Muriate of ammonia and iron. *d*. Murias Ammoniæ et Ferri, E. FERRUM AMMONIACALE, L. Muriate of ammonia and iron.

Prepared by mixing equal weights of red oxide of iron, waſhed and dried, and muriate of ammonia, and ſubliming, E. Doſe from three to ten grains.

972 Tincture of ammoniacal iron. *e*. Tinctura Ferri ammoniacalis, L. Tincture of ammoniacal iron.

iſtory of mple and fficinal edi[illegible] Prepared by digeſting four ounces of the preceding, with a pint of proof ſpirit, and ſtraining.

Uſed in ſimilar caſes with the tincture of muriate of iron, which is, however, to be preferred to it.

973 ncture of tated n. *f.* Tinctura Ferri acetati, D. Tincture of acetated iron.

Prepared by rubbing together in a glaſs mortar, acetated vegetable alkali, and vitrioiated iron, of each an ounce, till the maſs deliqueſces, and then adding during the trituration two pounds of alcohol, and ſtraining the ſolution.

A powerful aſtringent and tonic. Doſe 20 or 30 drops.

The preparations of iron, given in a moderate doſe, gradually raiſe the pulſe, improve the colour of the face, and increaſe the alvine, urinary, and cuticular excretions. Their taking proper effect is denoted by fetid eructations and black ſtools.

Theſe tonics are indicated chiefly in caſes of preternatural diſcharges, or ſuppreſſion of natural ſecretions or excretions, proceeding from a languor and ſluggiſhneſs of the fluids, and general weakneſs of the ſolids. They are therefore uſeful in paſſive hæmorrhages, in dyſpepſia, hyſteria, and chloroſis; in moſt of the cachexiæ, and in cancerous affections, and in the general debility that often remains after acute diſeaſes or exceſſive hæmorrhages.

The preparations of iron, when given too largely, or improperly, produce headach, anxiety, heat of ſkin, and not unfrequently hæmorrhages or vomiting, pains in the ſtomach, and ſpaſms and pains in the bowels. They are improper wherever the circulation is already too quick, the ſolids too tenſe and rigid; and where there is any ſtricture and ſpaſmodic contractions of the veſſels.

974 pper. 287. Cuprum, E. L. D. Copper. See Chemistry, p. 674.

975 bacetate copper. Subacetas Cupri. SUBACETIS CUPRI, E. ÆRUGO. Subacetate of copper. *Verdigris.* See Chemistry, N° 1995.

Employed chiefly as an eſcharotic, to deſtroy calloes edges or fungous fleſh, or as a ſtimulant to foul ulcers.

Officinal Preparations.

976 pared rdigris. *a.* Ærugo præparata, L. D. Prepared verdigris.

Prepared like other ſubſtances not ſoluble in water.

977 ymel of rdigris. *b.* Oxymel Æruginis, L. Oxymel of verdigris.

Prepared by diſſolving one ounce of prepared verdigris in ſeven ounces of vinegar, ſtraining through linen, and boiling with 14 ounces of clarified honey to a proper conſiſtance.

Sometimes uſed as a detergent gargle to venereal ulcerations of the mouth and tonſils, but with much precaution. More generally employed, mixed with ſome ſtimulant ointment, as an external ſtimulant and eſcharotic.

H[illegible] of [illegible] Officinal Medicines. *c.* Unguentum subacetitis Cupri, E. Ointment of ſubacetite of copper.

Prepared by mixing 15 parts of reſinous ointment, and one part of ſubacetite of copper.

978 [illegible] of ſubacec[illegible] per. *d.* Liquor Cupri ammoniati, D. AQUA CUPRI AMMONIATI, L. AQUA SAPPHARINA. Water of ammoniated copper. *Sapphire water.*

979 Water of ammoniated copper. Prepared by the Dublin college, by mixing four grains of prepared verdigris, and two ſcruples of ſal ammoniac, with eight ounces of freſh made lime water, digeſting for 24 hours, and pouring off the clear liquor.

Uſed as a ſtimulant and detergent lotion.

980 Sulphur of copper. 288. Sulphas Cupri, E. CUPRUM VITRIOLATUM, D. VITRIOLUM CÆRULEUM. Sulphate of copper. *Vitriolated copper. Blue* or *Roman vitriol. Blue ſtone.* See Chemistry, N° 1972.

Sometimes given internally as an emetic, in the doſe of from two to five grains, and as a tonic, a grain or two, ſeveral times a-day; but its internal uſe is dangerous. More frequently employed as an eſcharotic.

Officinal Preparations.

981 Compound ſolution of ſulphate of copper. *a.* Solutio Sulphatis Cupri composita, E. AQUA STYPTICA. Compound ſolution of ſulphate of copper. *Styptic water.*

Prepared by boiling three ounces of ſulphate of copper, and the ſame of ſulphate of alumina, in two pounds of water, till they are diſſolved; then adding one ounce and a half of diluted ſulphuric acid to the liquor previouſly filtered.

Employed chiefly as a ſtyptic for ſtopping ſuperficial hæmorrhages, or bleedings at the noſe.

982 Ammoniaret of copper. *b.* Ammoniaretum Cupri, E. CUPRUM AMMONIATUM, D. Ammoniaret of copper. *Ammoniated copper.*

Prepared by the Edinburgh college, by rubbing two parts of the pureſt ſulphate of copper with three parts of carbonate of ammonia carefully together, in a glaſs mortar, till the effervescence has entirely ceaſed, and they unite into a violet-coloured maſs, which is to be wrapt up in blotting paper, and dried, firſt upon a chalk ſtone, and afterwards by a gentle heat, and put into a phial that is to be cloſely ſtopped.

Employed as a tonic and antiſpaſmodic, chiefly in caſes of epilepſy. Doſe about half a grain or a grain, gradually increaſed to four or five grains, three or four times a-day.

983 Pills of ammoniaret of copper. *c.* Pilulæ ammoniareti Cupri, E. Pills of ammoniaret of copper.

Compoſed of 16 grains of ammoniaret of copper in fine powder, and four ſcruples of crumb of bread, beaten into a maſs with a ſufficient quantity of water or carbonate of ammonia, and immediately divided into 32 equal pills.

One or two of theſe pills is a moderate doſe.

For an account of the ill effects ariſing from copper [illegible] the poiſons [illegible] and Duncan's Diſpenſatory.

984 Silver. 289. Argentum, E. L. D. Silver. See Chemistry, p. 681.

Officinal Preparation.

985 Nitrate of ſilver. *a.* Nitras Argenti, E. ARGENTUM NITRATUM, L. D. CAUSTICUM LUNARE. Nitrate of ſilver. *Nitrated ſilver. Lunar cauſtic.*

Prepared by diſſolving in a phial, with a gentle heat, four ounces of the pureſt ſilver flattened into plates, and cut into pieces, in eight ounces of diluted nitrous acid, mixed with four ounces of diſtilled water, and evaporating to a dry maſs, which is to be put into a large crucible, and placed on a gentle fire, increaſed gradually till the maſs flows like oil; then pouring it into iron pipes previouſly heated and anointed with tallow, and when cool, putting it into a glaſs veſſel to be well ſtopped.

Employed chiefly as an eſcharotic, to deſtroy the callous edges of ulcers, warts, and other excreſcences; but lately much recommended, and employed with ſome ſucceſs, as a tonic in caſes of epilepſy. It ſhould be begun in very ſmall doſes, about one-eighth or one-fourth of a grain, diſſolved in diſtilled water, or made into a pill with crumb of bread, gradually increaſing the doſe to a grain or more, twice or three times a-day.

Chap. IV. *Gaſeous Subſtances.*

986 Oxygenous gas. 290. Gas Oxygeneum. Oxygenous gas. *Vital air.*

On the nature and properties of this gas, ſee Chemistry, N° 341.

When air, with an increaſed proportion of oxygen, is reſpired, it acts as a powerful ſtimulus, increaſing the circulation and animal heat, raiſing the ſpirits, and producing a temporary increaſe of vigour and activity, followed, however, in a ſhort time, by correſponding languor and wearineſs. From its ſtimulant effects, the reſpiration of ſuperoxygenated air has been much recommended in various caſes of debility, as chloroſis, epilepſy, aſthmatic and dropſical affections; but it ſeems now falling into diſuſe, from a conviction that practitioners were too ſanguine in their expectations.

See Alyon *Eſſai ſur les Proprietés Medicinales de l'Oxygene*, 8vo. Ward *Diſſert. Inaug. de Medicina Pneumatica*, Edin. 1800. Hodges's *Diſſert. Inaug. de Oxygenio*, Edin. 1801; and the Practical Synopſis.

987 Gaſeous oxide of azote. 291. Gas Azotii oxidum. OXIDUM NITROSUM. Gaſeous oxide of azote. *Nitrous oxide.* See Chemistry, p. 493, 494, where the nature and effects of this gas are detailed at ſufficient length.

As the reſpiration of this gas is not followed by the depreſſion and debility conſequent on the application of moſt other ſtimuli, it promiſes fair to become a uſeful remedy in ſome caſes of debility and atony of the vital powers; but it is not yet much employed except by way of philoſophical experiment. See Davy's Reſearches on Nitrous Oxide.

[illegible] and Officinal Medicines.

988 Hydrogen gas. 292. Gas Hydrogeneum. Hydrogen gas. *Inflammable air.* See Chemistry, N° 373, *et ſeq.*

Hydrogen gas diluted with about ten times its quantity of atmoſpheric air, has been recommended in aſthmatic complaints; but its ſucceſs has not equalled the expectations of phyſicians.

989 Car[illegible] gas. 293. Gas Hydrogeneum carbonatum. Carbonated hydrogen gas. See Chemistry, N° 412.

This gas, which is ſo deleterious when reſpired in its pure ſtate, has been ſtrongly recommended when diluted with about 20 parts of atmoſpheric air, as a remedy in phthiſis, in ſome caſes of which it has evidently been of ſervice, relieving the ſymptoms, and at leaſt arreſting the progreſs of the diſeaſe. It ſhould, however, be employed with great caution, and at firſt largely diluted.

990 Carbonic acid gas. 294. Gas acidum carbonicum. Carbonic acid gas. *Fixed air.* See Chemistry, N° 595.

Beſides the ſolution of this gas in water (ſee N° 875), uſed internally as a tonic and refrigerant, the gas itſelf, as evolved from fermenting ſubſtances, is a good ſtimulant or antiſeptic application to foul ulcers and cancerous ſores. The modification of this ſubſtance, which is contained in yeſt or barm, has been much employed of late in typhus, but we believe with no material benefit.

991 Caloric. 295. Caloricum. Caloric. *Heat.* See Chemistry, Chap. iii.

It would be in vain for us here to attempt any account of the effects of heat on the human body, and theſe have been amply detailed, both by chemical and phyſiological writers. It acts as a powerful ſtimulus, and as ſuch is often employed, eſpecially in the form of warm and vapour baths, in various caſes of debility and atony of the ſyſtem. The effects and uſes of the warm and vapour baths have been already mentioned under Water, as have the effects and uſes of the cold bath.

992 Light. 296. Lumen. Light. See Chemistry, Chap. ii.

Beſides its effect on the eye, in producing viſion, light evidently acts as a general and powerful ſtimulus, raiſing the ſpirits, and increaſing the vigour and activity of the body. See Ruſh's lectures on animal life.

993 Electricity. 297. Electricitas. Electricity.

Common electricity acts as a powerful ſtimulus on the ſyſtem, in proportion to the degree of concentration in which it is applied. When applied under the form of a ſtream, or continued diſcharge of electric fluid, its effects are the moſt gentle; but in general, when applied in the form of ſparks, it is more active, but its effects are more confined; and when applied by way of a ſhock, it acts very powerfully, producing an agitation of the muſcles of the part through which the ſhock is diſcharged; and if the ſhock is violent, the whole body partakes of the agitation. Electricity

History of Simple and Officinal Medicines.

lectricity has been found of ſervice, chiefly in caſes of paralyſis, and of uterine obſtruction dependent on debility.

For the mode of applying electricity to the body, under its various ſtates, we muſt refer to Cavallo's Medical Electricity, and Cuthbertſon's Practical Electricity and Galvaniſm.

994 Galvaniſm.

298. GALVANISMUS. Galvaniſm.

This modification of electricity is found to have produced ſtill greater effects on the human body, when applied under particular circumſtances, into which we have not now room to enter. Much has of late been written on the efficacy of this powerful agent in the cure of various diſeaſes, but like moſt other new remedies, its powers have been greatly overrated. It appears to have been moſt ſucceſsful in caſes of local paralyſis, or nervous atony. In particular, it has in ſeveral inſtances relieved deafneſs, eſpecially that ſpecies which ſeems to ariſe from torpor of the auditory nerve.

For the effects of galvaniſm on the body, and its application in medicine, ſee Wilkinſon's Elements of Galvaniſm, vol. ii. p. 441.; Cuthbertſon's Electricity and Galvaniſm; the Edinburgh Medical and Surgical Journal, &c.

ADDENDUM.

The following was omitted among the preparations of iron.

Precipitated carbonate of iron.

g. CARBONAS FERRI PRÆCIPITATUS, E. Precipitated carbonate of iron.

Prepared by decompoſing a ſolution of ſulphate of iron by a ſolution of carbonate of ſoda; waſhing and drying the precipitate.

Similar in its virtues to 961. Doſe five to 30 grains.

* * *

The ſpace allotted to this article was ſo ſmall, and the time for preparing it ſo ſhort, that it is, of neceſſity, much leſs full and complete than it might otherwiſe have been. As it was impoſſible, under ſuch circumſtances, to produce any thing like an original and complete treatiſe, the compiler has endeavoured to render as uſeful as poſſible the ſelection that he found it neceſſary to make, and to ſupply the unavoidable deficiencies by a reference to the moſt reſpectable works on the ſubject.

ERRATA.—N° 620; *for* The London and Dublin tinctures, *read* The Edinburgh and Dublin tinctures; *and for* ten grains, *read* ten drams.

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